FY 1999 CONGRESSIONAL BUDGET REQUEST
WEAPONS STOCKPILE STEWARDSHIP
PROGRAM FUNDING PROFILE
(Dollars in Thousands)

	FY 1997 Current Appropriation	FY 1998 Original Appropriation	FY 1998 Adjustments	FY 1998 Current Appropriation	FY 1999 Budget Request
Weapons Stockpile Stewardship					
Core Stockpile Stewardship					
Operations & Maintenance	$ 1,132,570	$ 1,288,290	$ (7,186)	$ 1,281,104	$ 1,505,832
Construction	91,737 a/	98,810	0	98,810	115,543
Subtotal	$ 1,224,307	$ 1,387,100	$ (7,186) b/	$ 1,379,914	$ 1,621,375
Inertial Confinement Fusion					
Operations & Maintenance	234,560	217,000	(1,346)	215,654	213,800
Construction	131,900	197,800	0	197,800	284,200
Subtotal	$ 366,460	$ 414,800	$ (1,346) b/	$ 413,454	$ 498,000
Technology Partnerships & Education					
Operations & Maintenance	69,400	65,250	(405) b/	64,845	69,000
Total, Stockpile Stewardship	$ 1,660,167	$ 1,867,150	$ (8,937) b/	$ 1,858,213	$ 2,188,375
Adjustment	$ (3,400) a/	$ 0	$ (454) c/	$ (454)	$ 0
Total, Stewardship, New Budget Authority	$ 1,656,767	$ 1,867,150	$ (9,391)	$ 1,857,759	$ 2,188,375

Public Law Authorization

National Defense Authorization Act for FY 1998, Public Law 105-340, November 1997.

Notes

a/ Reflects reprograming of $3,400,000 of prior year funds to the Defense Engineering Laboratory, Sandia National Laboratories, subproject of Nuclear Weapons Research, Development & Testing Facilities Revitalization, Phase II (88-D-106).

b/ Reflects Stockpile Stewardship's allocation of the $20,000,000 General Reduction to the Weapons Activities appropriation.

c/ Reflects Stockpile Stewardship allocation of appropriated use of prior year balances: $359,043 Core Stockpile Stewardship, $52,000 Inertial Confinement Fusion, $40,915 Technology Partnerships, and $2,047 Education.

DEPARTMENT OF ENERGY
FY 1999 CONGRESSIONAL BUDGET REQUEST
WEAPONS ACTIVITIES
(Tabular dollars in thousands, Narrative in whole dollars)

WEAPONS STOCKPILE STEWARDSHIP

PROGRAM MISSION

NOTE: Detailed site funding for Stockpile Stewardship is provided in the Defense Programs Executive Budget Summary.

The Defense Programs Stockpile Stewardship Program is a single, highly integrated technical program for maintaining the safety and reliability of the U.S. nuclear stockpile in an era without underground nuclear testing and without new nuclear weapons development and production. Traditionally, the activities of the three weapons laboratories and the Nevada Test Site have been regarded separately from those of the weapons production plants. However, although they remain separate budget decision units within Weapons Activities at this time, all stockpile stewardship and management activities have achieved a new, closer linkage. The program activities are seamless and continual. Assessment and certification pervade all activities, from surveillance through manufacturing. Likewise, computational modeling and prediction are integral to every activity, from assessments of aging-related changes to the design and certification of replacement components, to projections of stockpile life extension.

Activities in the Stockpile Stewardship and Stockpile Management decision units both make contributions in several vital areas for Defense Programs. Examples of these areas of shared responsibility include: enhanced surveillance, advanced manufacturing techniques, stockpile life extension activities, and warhead revalidation, recertification, and rebuilds. Some program activities are funded jointly between the Stockpile Stewardship and Stockpile Management decision units, reflecting both congressional direction and recognition of the historical location of laboratory and plant funding. The activities described in this section of the budget explain all funding provided by the Stockpile Stewardship decision unit, but considering the crosscutting nature of many of the activities, additional funding for some of the activities described in this section can also be found in Stockpile Management. As mentioned in the Executive Budget Summary, a review of the Defense Programs budget structure will be undertaken in the FY 2000 budget formulation cycle to address these situations.

By Presidential Decision Directive and Act of Congress (P.L. 103-160), the Department was directed to "establish a stewardship program to ensure the preservation of the core intellectual and technical competencies of the U.S. in nuclear weapons." In his announcement on August 11, 1995, to seek a "zero" yield Comprehensive Test Ban Treaty (CTBT), the President included a series of safeguards that define the conditions necessary for a CTBT, which the United Nations General Assembly endorsed, and the President later signed on September 24, 1996 and submitted to the Senate for ratification on September 23, 1997. Safeguard A specifically calls for a science-based Stockpile Stewardship (SBSS) program to ensure the safety and reliability of the stockpile and Safeguard C requires that the U.S. maintain the basic capability to resume underground nuclear testing.

Weapons Stockpile Stewardship provides upgraded or new experimental, computational, and simulation tools needed to address issues of maintaining confidence in the safety, security, and reliability of the nuclear stockpile without nuclear testing. It also includes research and development to provide the technology required for stockpile management. Key to the success of this science-based program is ensuring that highly qualified people are available for national security programs. At the most fundamental level, the Stockpile Stewardship program relies on the judgment and skills of experienced civilian and military specialists, supported by essential experimental and computational resources, and the preservation of their knowledge base.

Nuclear weapons are not static objects. Materials change over time. Although some of these changes do not adversely affect warhead safety, reliability, or performance, some may. In addition, with the average age of the stockpile now approaching 15 years, it is expected that new problems will arise. Weapons systems will require knowledgeable surveillance, evaluation and assessment, and, in time, modifications to extend their operational lifetime. The Stockpile Stewardship program will enable the DOE to identify and address these changes in the most cost efficient manner possible, and, at the same time, maintain confidence in the stockpile without relying on nuclear testing.

Weapons Stockpile Stewardship supports the following OBJECTIVES:

- Maintain confidence in the safety, reliability, and performance of the nuclear weapons stockpile without nuclear testing.
- Replace nuclear testing with a science-based Stockpile Stewardship and Management Program.
- Ensure the vitality of DOE's national security enterprise.
- Reduce nuclear weapon stockpiles and the proliferation threat caused by the possible diversion of nuclear materials.

Weapons Stockpile Stewardship supports the following STRATEGIES:

- Extend the life of U. S. nuclear weapons by continuing the Stockpile Life Extension Program and Stockpile Maintenance activities.
- Improve detection and prediction capabilities for assessing nuclear weapon component performance and the effects of aging.
- Continually evaluate the safety, reliability, and performance of the nuclear weapons stockpile.
- Develop the advanced simulation and modeling technologies necessary to confidently mitigate the loss of underground testing.
- Develop new nuclear weapons physics experimental test capabilities.
- Advance our understanding of the fundamental characteristics of weapons behavior through weapon systems engineering and advanced experiments to support future assessments of weapons safety, reliability, and performance.
- Provide an appropriately-sized, cost-effective, safe, secure, and environmentally sound national security enterprise.
- Ensure that sufficient scientific and technical personnel are available to meet DOE's long-term national security requirements.
- Ensure and enhance protection of nuclear materials, sensitive information, and facilities.
- Maintain test readiness and maintain and enhance emergency response and management capabilities to address any nuclear weapons, radiological or other emergency in the U.S. or abroad.
- Dismantle nuclear warheads that have been removed from the U.S. nuclear weapons stockpile in a safe and secure manner.

PERFORMANCE MEASURES:

For **FY 1999**, the significant overall performance measures for the Stockpile Stewardship program include:

- Certifying the nuclear weapons stockpile safety, reliability, and performance according to DOE/DoD procedures.
- Meeting all DoD annual weapons alteration, modification, and surveillance schedules.
- Revalidate of the military characteristics of the W76 warhead and begin revalidation of a second weapon type.
- Accelerating the ongoing development of critical, full-physics, three-dimensional weapons simulation codes, specifically perform sustained weapons simulations at 1 trillion operations per second.
- Completing the installation of a 3 trillion operations per second computer system.
- Meet all cost and schedule goals for construction of the National Ignition Facility and related technology development.
- Completing phase one of the Dual-Axis Radiographic Hydrodynamic Test Facility (DARHT) and completing Title I, Preliminary Design of the remainder of the project.
- Making the decision within the five year period whether to construct an advanced hydrotest facility and/or an advanced pulsed power facility.
- Conducting three to four subcritical experiments at the Nevada Test Site to provide valuable scientific information about the behavior of nuclear materials during the implosion phase of a nuclear weapon.
- All facilities required for successful achievement of the Stockpile Stewardship and Management Plan are operational.
- Adhering to schedules set forth in the Advanced Design and Production Technology Multi-Year Program Plan.
- Establishing strategic alliances and collaborations among the weapons laboratories, industries, and universities to enable effective use of scientific and technical personnel throughout the R&D community.
- The capability to resume underground testing is maintained, in accordance with Presidential direction.

Success will be measured in **FY 1998** by:

- Certifying nuclear weapon stockpile safety, reliability, and performance according to DOE/DoD procedures.
- Meeting all DoD annual weapons alteration, modification, and surveillance schedules.
- Continuing revalidation of the W76 using two teams of experts from the design labs.
- Maintaining momentum in the Accelerated Strategic Computing Initiative through ongoing development of critical full physics three-dimensional weapon simulation codes, specifically perform sustained weapons simulations at 1 trillion operations per second.
- Meeting established schedules for the development and installation of a 3 trillion operations per second computer system.
- Beginning the physical construction according to schedules in the Project Execution Plan for the National Ignition Facility.
- Completing facility construction of the first arm of the Dual-Axis Radiographic Hydrodynamic Test Facility (DARHT) at the Los Alamos National Laboratory and beginning the preliminary design of the second axis accelerator for DARHT.
- Making the decision within the five year period whether to construct an advanced hydrodynamic facility and/or an advanced pulsed power facility.
- Conducting three or four subcritical experiments to provide information about the behavior of nuclear materials during the implosion phase of a nuclear weapon.

- Assuring that all facilities required for successful achievement of the Stockpile Stewardship and Management Plan are operational.
- Adhering to schedules set forth in the Advanced Design and Production Technology Plan.
- Establishing strategic alliances and collaborations among the weapons laboratories, industries, and universities to effectively leverage scientific and technical personnel throughout the R&D community.
- Ensuring that the capability to resume underground testing is maintained in accordance with the Presidential Decision Directive and Safeguard C of the CTBT through a combined experimental and test readiness program.
- Adhering to schedules for the safe and secure dismantlement of approximately 1,000 nuclear warheads that have been removed from the U.S. nuclear weapon stockpile.

SIGNIFICANT ACCOMPLISHMENTS AND PROGRAM SHIFTS:

During **FY 1997**, implementation of the Stockpile Stewardship program, initiated in FY 1994, continued in accordance with the Stockpile Stewardship and Management Plan with the following specific accomplishments:

- Completed initial risk assessments for each enduring stockpile weapon by the end of FY 1997. **Status: Successful**
- Completed the W87 Life Extension Program design assessment phase by June 1997. **Status: Successful**
- Certified annually that the stockpile was safe and reliable. **Status: Successful**
- Met all DoD annual weapons alteration, modification, and surveillance schedules. **Status: Partially Successful** because we were slightly behind on nuclear component laboratory tests and nonnuclear systems tests due to Pantex operational issues associated with radiography and mass properties testing.
- Installed the first teraflop platform by September 1997 to begin next generation weapon simulations. **Status: Successful**
- Conducted key stewardship experiments on the Los Alamos Neutron Science Center (LANSCE) to:
  a) demonstrate the feasibility of high energy proton radiography in submillisecond imaging;
  b) measure crystallographic texture of stockpile plutonium samples at various stages of aging;
  c) improve the nuclear cross section database of plutonium in support of enhanced archival analysis. **Status: Successful**
- Maintained the Nevada Test Site at a 2-3 year readiness to resume testing. **Status: Successful**
- Conducted two subcritical experiments ("Rebound" and "Holog") at the Nevada Test Site providing valuable experimental data as well as exercising nuclear test readiness capabilities. **Status: Successful**
- Met Dual Axis Radiographic Hydrodynamic Test (DARHT) facility construction milestones by:
  a) selecting technology and determining scope of the second axis by June 1997. **Status: Partially successful** due to delay until September of technology selection.
  b) completing 3/4 of the hydrotest firing site by September 1997. **Status: Successful**
- Met National Ignition Facility construction milestones with:
  a) site selection by December 1996;
  b) initiation of site preparation and long lead procurements by March 1997;

c) remaining on schedule to complete project in 3rd quarter of 2003 with total project costs of $1.2 billion. **Status: Successful**

- Continued to investigate competing technologies to meet the advanced radiography requirements of the science-based Stockpile Stewardship program. **Status: Successful**
- Initiated the third Accelerated Strategic Computing Initiative (ASCI) industry partnership and continued development of high-fidelity 3D codes necessary to implement the program plan to provide the leading-edge computational modeling and simulation capabilities that are essential to maintain the safety, reliability, and performance of the stockpile in the absence of underground nuclear testing. **Status: Successful**
- Completed engineering and design activities on the major Stockpile Stewardship programmatic construction projects begun in FY 1996: the Contained Firing Facility addition to the Flash X-Ray facility at Site 300 at Lawrence Livermore National Laboratory (LLNL), the Atlas facility at Los Alamos National Laboratory (LANL), and the Processing and Environmental Technology Laboratory (PETL) at Sandia National Laboratories. **Status: Successful**
- Completed transition of the Technology Partnership program from private industry driven Cooperative Research and Development Agreements to Stockpile Stewardship driven or specific projects in response to the evolution of the requirements of the post-cold war, post-underground nuclear testing environment of the Stockpile Stewardship program and continued to support the American Textile Partnership (AMTEX), the Partnership for a New Generation of Vehicles (PNGV), and the Advanced Computational Technology Initiative (ACTI). **Status: Successful**

Changes from FY 1998 and FY 1999 Highlights:

The Stockpile Stewardship program is requesting $2,188.4 million in FY 1999, an increase of $330.2 million or 17.8 percent above the FY 1998 appropriation. The request includes continued funding for the physical and intellectual infrastructure at the weapons laboratories and the Nevada Test Site, providing the scientific and engineering tools needed to address issues of maintaining confidence in the safety, reliability, and performance of the nuclear weapon stockpile without nuclear testing. Also, $5.5 million is included for nuclear criticality activities associated Defense Nuclear Facilities Safety Board Recommendation 97-2, "Criticality Safety" and the Nuclear Criticality Predictability Program which was established in response to Board Recommendation 93-2. In addition, funding is continued for several initiatives undertaken to support the science-based Stockpile Stewardship program. The Stockpile Stewardship programs' increase is driven by ASCI, the construction funding schedule for the National Ignition Facility (NIF), and the transfer of funding associated with Waste Management activities at the Los Alamos and Sandia National Laboratories from the Office of Environmental Management.

New Departmental Security Clearance Funding Policy - In FY 1999, the Department will divide funding responsibility for obtaining and maintaining security clearances. The Office of Security Affairs, which has been responsible for funding all Federal and contractor employee clearances, will pay for clearance of Federal employees, both at headquarters and the field, as well as contractors at headquarters. Defense Programs will now be responsible for clearances of contractors in the field who directly support the DP mission, using program funds. This change in policy will enable program managers to make the decision as to how many and what level clearances are necessary for effective program execution.

Core Stewardship - Funding is increased for: Core Research and Advanced Technology activities mainly associated with performance assessment, physics and advanced hydrodynamic research (+$15.8M); Programs and Initiatives efforts mainly associated with the transfer of Waste Management

activities at the Los Alamos and Sandia National Laboratories from the Office of Environmental Management (+$61.9M); four new infrastructure construction line items and three new programmatic construction line items (+$16.7M); and security clearances (+$5.2M). In addition, this budget reflects the Department's recent technology decision on the second axis of DARHT. While there is no funding increase in FY 1999, the selection of the Long-Pulse Induction Accelerator generating four high-resolution radiographic pulses over two microseconds results in a TEC increase of $73 million for the project.

Accelerated Strategic Computing Initiative - Funding is increased for: 3-D code development for both performance and safety codes at each of the labs utilizing capabilities of the Option Blue Machines; new safety / manufacturing codes to be validated by modeling key safety experiments in a variety of scenarios (storage, accidents, aging stockpile, etc.); prototype applications operating in distributed mode, and a unified high performance storage system (+ $105.6M).

Stockpile Computing - Funding is increased to: institute the Numeric Environment for Weapon Simulation (+$31.0M) which will provide the computational and computer infrastructure which combines simulation codes and platforms with the problem solving tools and visualization tools to form a distributed high-end computing environment for weapons assessment; and Stockpile Computing continues at a rate near the FY 1998 level (+ $5.3M) .

Inertial Confinement Fusion - FY 1999 is the peak year of construction funding for NIF, with an increase over FY 1998 of $86.4 million. NIF other project costs decrease by $24.5 million in FY 1999 as optics facilitization activities near completion; however, the ICF base program includes increased funding of $22.6 million to support NIF optics pilot production, a backlighter for Z, and increased support for weapons physics shots on Omega.

Technology Partnerships/Education - The FY 1998 appropriation for Technology Partnerships was reduced $4.1 million from the request, with no funding provided for the Partnership for a New Generation of Vehicles. FY 1999 funding for Technology Partnerships and Education increases $4.2 million over the FY 1998 appropriation and maintains the FY 1998 level of effort.

FACILITY OPERATIONS:

STOCKPILE STEWARDSHIP SITES: Weapons Stockpile Stewardship activities are conducted predominantly at the three defense laboratories, Lawrence Livermore, Los Alamos, and Sandia National Laboratories in California and New Mexico, and at the Nevada Test Site. Funding is also provided to the University of Rochester, the Naval Research Laboratory, and General Atomics through the Inertial Confinement Fusion program and to various production sites for research and development activities related to Stockpile Stewardship. Other miscellaneous locations are funded through the Stockpile Stewardship program as noted on the funding by location table included in the Weapons Activities Executive Budget Summary.

The Stockpile Stewardship program is responsible for maintaining the research and development (R&D) infrastructure, which includes not only the physical complex of the three laboratories and the Nevada Test Site, but also the scientists and engineers and the basic and applied research base on

which the vitality and technical capabilities of the laboratories and the Test Site rest. The success of the Stockpile Stewardship program is dependent upon Defense Programs' ability to maintain the level of scientific based capability needed to provide the ongoing technology and science resources required to insure that any Department question can be addressed by the best scientists and engineers using the most advanced sciences and technologies. This capability is of primary importance for the nuclear weapons stockpile responsibilities of the Department, but also supports the needs of other users of the laboratories and the Nevada Test Site by maintaining basic capabilities.

Defense Programs oversees and coordinates site-wide environmental documentation activities at the three laboratories and the Nevada Test Site, as the Department's landlord, although funding is provided by all affected activities at each site. The Record of Decision on the Nevada Test Site site-wide environmental impact statement (SWEIS) was completed in December 1996. The Los Alamos National Laboratory SWEIS is being prepared and the draft SWEIS should be distributed for comment in March 1998. The Sandia National Laboratories SWEIS has begun(at New Mexico), with a Notice of Intent completed in May of 1997 and the draft SWEIS is scheduled for distribution for comment in fourth quarter FY 1998. Defense Programs is also conducting a five-year review or supplement analysis of the Lawrence Livermore National Laboratory SWEIS, originally completed in 1992; a determination on this supplement analysis is expected in March 1998. The Stockpile Stewardship and Management programmatic environmental impact statement (PEIS), the basis of the FY 1997 Record of Decision for Defense Programs, supports major projects including the National Ignition Facility (NIF). Defense Programs is preparing a supplemental EIS for the National Ignition Facility to review the environmental impacts of additional information discovered since the Stockpile Stewardship and Management PEIS was completed.

Management and funding responsibility for several production related facilities at LANL, including the Plutonium Facility (Technical Area 55), the Chemistry and Materials Research Laboratory (CMR), and the Los Alamos Criticality Experiments Facility (LACEF), was transferred to the Weapons Stockpile Management decision unit in FY 1998.

The budget includes $18 million in Operations and Maintenance funds for a one-time expense of converting the radio system at the Nevada Test Site (NTS). This radio conversion is mandated by law, and due to the large geographical area of operations at the NTS (approximately 3,400 square miles) and rugged terrain, mobile radios are the only current technology available to meet the communication requirements supporting the experimental and test readiness missions of the NTS.

The budget also includes $7.7 million to complete funding for the upgrades of the Los Alamos Neutron Science Center (LANSCE) - a short pulse spallation source. These upgrades will allow Stockpile Stewardship and Management Program researchers to obtain dynamic and surveillance measurements more quickly and accurately. It will also improve facility reliability and maintainability and reduce worker radiation exposure.

CONCEPTUAL DESIGN REPORTS and POST-CONCEPTUAL DESIGN ENGINEERING: During the budget request period, FY 1997-FY 1999, there are no Conceptual Design Reports (CDR) for new construction projects which will exceed $3 million in cost. However, Defense Programs may choose to begin conceptual design activities for an advanced hydrotest facility and an advanced pulsed power facility. It is estimated that each of these conceptual design reports may cost in excess of $1 million.

BUDGET STRUCTURE:

The Weapons Stockpile Stewardship budget request is organized in the following manner:

- **SUMMARY LEVEL FUNDING DATA** is provided for all of Weapons Stockpile Stewardship followed by a funding table showing detail for operations and maintenance funding, capital operating expenses, and line item construction projects. Funding by site and contractor employment by site are included in the Defense Programs Executive Budget Summary.

- **CORE STOCKPILE STEWARDSHIP** supports the specific activities required for science-based Stockpile Stewardship through the maintenance of the physical and intellectual infrastructure at Lawrence Livermore National Laboratory, Los Alamos National Laboratory, Sandia National Laboratories and the Nevada Test Site. Major program elements include Programs and Initiatives, Core Research and Advanced Technology, and Testing Capabilities and Readiness. The budget structure for Core Stockpile Stewardship is more "functional" than "programmatic." Because there is such a large research and development aspect to Stockpile Stewardship, in many cases, the basic capabilities that we must maintain across the laboratories and plants serve many programmatic objectives. While they are not "functional" in the same sense as the Department's Functional Cost Reporting structure which focusses on indirect activities, they are inputs, rather than outputs, for the laboratories.

- **INERTIAL CONFINEMENT FUSION** is a research and advanced technology development effort directly supporting the Department's national security mission in Stockpile Stewardship. The National Ignition Facility (96-D-111), a 192-beam neodymium glass laser facility intended to achieve controlled thermonuclear fusion in the laboratory, which is being constructed at LLNL and is a cornerstone of the Stockpile Stewardship program, is the major initiative in this program.

- **TECHNOLOGY PARTNERSHIPS AND EDUCATION** directly share the expertise and scientific development in the laboratories with the private sector and obtain skills and knowledge from the private sector for the enhancement of laboratory capabilities. Technology Partnerships strengthen the science and technology base through participation in cooperative, dual-benefit partnerships with private industry. Education initiatives support science education activities that exercise the unique capabilities of the Department of Energy with emphasis on graduate and post-graduate activities.

FY 1999 CONGRESSIONAL BUDGET REQUEST
WEAPONS STOCKPILE STEWARDSHIP
(Dollars in Thousands)

Funding Schedule:

Program Activity	FY 1997	FY 1998	FY 1999	$ Change	% Change
CORE STOCKPILE STEWARDSHIP					
PROGRAMS & INITIATIVES					
DIRECT STOCKPILE ACTIVITIES					
Stockpile Readiness Program	40,305	48,542	53,681	5,139	11%
Enduring Stockpile Program	91,252	94,533	95,958	1,425	2%
Future Stockpile Program	22,822	23,331	27,097	3,766	16%
Stockpile Reduction Program	12,602	14,585	5,925	(8,660)	-59%
Subtotal, Direct Stockpile Activities	$ 166,981	$ 180,991	$ 182,661	$ 1,670	1%
EXPERIMENTAL ACTIVITIES					
Archiving	12,217	13,438	15,192	1,754	13%
Nuclear Component Assessment	13,090	14,086	13,525	(561)	-4%
Nonnuclear Component Assessment	5,380	5,397	6,232	835	15%
Subtotal, Experimental Activities	$ 30,687	$ 32,921	$ 34,949	$ 2,028	6%
ACCELERATED STRATEGIC COMPUTING INITIATIVE					
Advanced Applications	74,896	110,956	152,000	41,044	37%
Platforms	29,425	48,780	70,000	21,220	44%
Problem Solving Environments	29,510	39,755	45,800	6,045	15%
Strategic Alliances and Investigations	6,500	15,500	13,500	(2,000)	-13%
Distributed Distance Computing	0	0	28,400	28,400	
Verification & Validation	0	0	13,400	13,400	
One Program/Three Labs	11,284	8,538	6,000	(2,538)	-30%
Subtotal, Accelerated Strategic Computing Initiative	$ 151,615	$ 223,529	$ 329,100	$ 105,571	47%

FY 1999 CONGRESSIONAL BUDGET REQUEST
WEAPONS STOCKPILE STEWARDSHIP
(Dollars in Thousands)

Funding Schedule:

Program Activity	FY 1997	FY 1998	FY 1999	$ Change	% Change
SPECIAL PROJECTS					
Extraordinary ES&H Site Remediation	1,887	662	0	(662)	-100%
Joint DoD/DOE Munitions Tech'y Development Program	12,742	13,730	13,015	(715)	-5%
Other Activities	7,719	3,366	70,209 a/	66,843	1986%
Subtotal, Special Projects	$ 22,348	$ 17,758	$ 83,224	$ 65,466	369%
Subtotal, PROGRAMS & INITIATIVES	$ 371,631	$ 455,199	$ 629,934	$ 174,735	38%
CORE RESEARCH & ADVANCED TECHNOLOGY					
PERFORMANCE ASSESSMENT SCIENCE & TECHNOLOGY					
Performance Assessment	44,852	42,503	58,627	16,124	38%
Physics	125,158	151,332	157,119	5,787	4%
Los Alamos Neutron Science Center	37,160	41,300	46,300	5,000	12%
Advanced Hydrodynamic Radiography	5,000	20,474	36,000	15,526	76%
Subtotal, Performance Assessment Science & Technology	$ 212,170	$ 255,609	$ 298,046	$ 42,437	17%
SYSTEMS COMPONENTS SCIENCE & TECHNOLOGY					
Systems Engineering	67,309	64,536	55,028	(9,508)	-15%
Electronics, Photonics, Sensors & Mechanical Components	32,939	45,074	27,100	(17,974)	-40%
Advanced Manufacturing	20,129	12,626	16,162	3,536	28%
Subtotal, Systems Components Science & Technology	$ 120,377	$ 122,236	$ 98,290	$ (23,946)	-20%
CHEMISTRY AND MATERIALS SCIENCE & TECHNOLOGY					
Chemistry and Materials	12,156	14,585	13,345	(1,240)	-9%
High Explosives	14,264	14,815	21,649	6,834	46%
Special Nuclear Materials	35,146	30,368	22,087	(8,281)	-27%
Tritium	7,847	5,492	5,533	41	1%
Subtotal, Chemistry and Materials Science & Technology	$ 69,413	$ 65,260	$ 62,614	$ (2,646)	-4%

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(Dollars in Thousands)

Funding Schedule:

Program Activity	FY 1997	FY 1998	FY 1999	$ Change	% Change
STOCKPILE COMPUTING					
Stockpile Computing	155,145	150,560	155,900	5,340	4%
Numeric Environment for Weapons Simulation	0	0	31,000	31,000	
Subtotal, Stockpile Computing	$ 155,145	$ 150,560	$ 186,900	$ 36,340	24%
Subtotal, CORE RESEARCH & ADVANCED TECHNOLOGY	$ 557,105	$ 593,665	$ 645,850	$ 52,185	9%
TESTING CAPABILITIES & READINESS	$ 166,020	$ 180,428	$ 183,900	$ 3,472	2%
LABORATORY CAPITAL EQUIPMENT/GPP/ Other INFRASTRUCTURE	$ 37,814	$ 51,812	$ 46,148	$ (5,664)	-11%
TOTAL, CORE STEWARDSHIP O & M	$ 1,132,570	$ 1,281,104	$ 1,505,832	$ 224,728	18%
CONSTRUCTION LINE ITEMS	$ 91,737 b/	$ 98,810	$ 115,543	$ 16,733	17%
TOTAL, CORE STOCKPILE STEWARDSHIP	$ 1,224,307	$ 1,379,914	$ 1,621,375	$ 241,461	17%

FY 1999 CONGRESSIONAL BUDGET REQUEST
WEAPONS STOCKPILE STEWARDSHIP
(Dollars in Thousands)

Funding Schedule:

Program Activity	FY 1997	FY 1998	FY 1999	$ Change	% Change
INERTIAL CONFINEMENT FUSION					
OPERATIONS & MAINTENANCE					
ICF Core Program	$ 175,360	$ 184,354	$ 207,000	$ 22,646	12%
National Ignition Facility - Other Project Costs	59,200	31,300	6,800	(24,500)	-78%
TOTAL, ICF OPERATIONS & MAINTENANCE	$ 234,560	$ 215,654	$ 213,800	$ (1,854)	-1%
CONSTRUCTION					
96-D-111, National Ignition Facility	$ 131,900	$ 197,800	$ 284,200	$ 86,400	44%
TOTAL, INERTIAL CONFINEMENT FUSION	$ 366,460	$ 413,454	$ 498,000	$ 84,546	20%
TECHNOLOGY PARTNERSHIPS & EDUCATION					
OPERATIONS & MAINTENANCE					
TECHNOLOGY PARTNERSHIPS	$ 59,400	$ 55,901	$ 60,000	$ 4,099	7%
EDUCATION	$ 10,000	$ 8,944	$ 9,000	$ 56	1%
TOTAL, TECHNOLOGY PARTNERSHIPS & EDUCATION O&M	$ 69,400	$ 64,845	$ 69,000	$ 4,155	6%
TOTAL, WEAPONS STOCKPILE STEWARDSHIP	$ 1,660,167	$ 1,858,213	$ 2,188,375	$ 330,162	18%
Adjustment	$ (3,400) b/	$ (454) c/	$ 0	$ 454	-100%
TOTAL, NEW BUDGET AUTHORITY (Noncomparable)	$ 1,656,767	$ 1,857,759	$ 2,188,375	$ 330,616	18%

a/ Reflects transfer of $61.9 million from the Office of Environmental Management for waste management activities at Los Alamos National Laboratory and Sandia National Laboratories.

b/ Reflects reprogramming of $3,400,000 of prior year funds to the Defense Engineering Laboratory, Sandia National Laboratories, subproject of Nuclear Weapons Research, Development & Testing Facilities Revitalization, Phase II (88-D-106).

c/ Reflects use of prior year balances to offset appropriation per Congressional direction: $359,043 Core Stockpile Stewardship, $52,000 Inertial Confinement Fusion, $40,915 Technology Partnerships, and $2,047 Education.

FY 1999 CONGRESSIONAL BUDGET REQUEST
WEAPONS STOCKPILE STEWARDSHIP
CAPITAL OPERATING EXPENSES
(Detail and Crosscut Dollars in Thousands)

	Prior Years	Fiscal Year 1997	Fiscal Year 1998	Fiscal Year FY 1999	$ CHG	% CHG
OPERATIONS & MAINTENANCE						
Other (Line Item) Project-Related Costs (OPC)						
Conceptual Design Costs in Excess of $3 million						
96-D-111, National Ignition Facility	$ 12,300	$ 0	$ 0	$ 0	$ 0	0%
OPC, not included above, for FY 1999 Requested Line Items a/	49,263	37,069	56,277	17,329	(38,948)	-69%
Subtotal, Other (Line Item) Project-Related Costs	$ 61,563	$ 37,069	$ 56,277	$ 17,329	$ (38,948)	-69%
Capital Equipment b/						
Capital Equipment - Core Stockpile Stewardship						
Basic Capital Equipment	$ 40,694	$ 21,029	$ 23,000	$ 22,000	$ (1,000)	-4%
Major Items of Equipment						
Radio Conversion, NV	0	0	0	18,000	18,000	100%
LANSCE Upgrade, LANL	0	3,000	6,000	7,700	1,700	28%
Automated Data Processing Equipment						
Computations & Modeling	0	38,645	38,600	54,000	15,400	40%
Production Processing Facility, LLNL	0	3,000	0	0	0	0%
System Interconnection Network, LLNL	0	2,000	0	0	0	0%
Supercomputer 97, SNL	0	5,000	0	0	0	0%
ASCI Blue Machine, LANL	10,000	10,000	0	0	0	0%
ASCI Blue Machine, Phases A, B, and C; LLNL	5,000	5,000	0	0	0	0%
Meiko CS-2 Tech Insertion, LLNL	1,000	0	0	0	0	0%
Cray J-90 SMP Upgrade, LLNL	1,000	0	0	0	0	0%
Object Data Archive I, LLNL	3,000	0	0	0	0	0%
Prior Year ADP Projects	(1,306)	0	0	0	0	0%
Subtotal, ADP	18,694	63,645	38,600	54,000	15,400	40%
Subtotal, Capital Equipment - Core Stockpile Stewardship	59,388	$ 87,674	$ 67,600	101,700	$ 34,100	50%

Weapons Stockpile Stewardship, Capital Operating Expenses (Continued)

Capital Equipment - Inertial Confinement Fusion	7,400	8,925	9,000	9,000	0	0%
Capital Equipment - Technology Partnerships & Education	0	165	150	150	0	0%
Subtotal, Capital Equipment - Stockpile Stewardship	$ 66,788	$ 96,764	$ 76,750	$ 110,850	$ 34,100	44%
General Plant Projects b/						
Core Stockpile Stewardship	$ 8,100	$ 16,564	$ 22,000	$ 20,000	$ (2,000)	-9%
Inertial Confinement Fusion	(597)	731	380	400	20	5%
Technology Partnerships & Education	0	0	0	0	0	0%
Subtotal, General Plant Projects	$ 7,503	$ 17,295	$ 22,380	$ 20,400	$ (1,980)	-9%
Total, Capital Operating Expenses	$ 135,854	$ 151,128	$ 155,407	$ 148,579	$ (6,828)	-4%

a/ Other Project-Related Costs for line items requesting funding in FY 1999 but which do not have a Conceptual Design Report (CDR) that cost in excess of $3 million.

b/ Since funds are appropriated for Operations and Maintenance, which includes operating expenses, capital equipment (CE) and general plant projects (GPP), we no longer budget separately for CE and GPP. FY 1997 represents actual obligations for CE and GPP as reported by the contractors. FY 1998 and FY 1999 are estimates based on FY 1997 actuals and the FY 1998 appropriation.

DEFENSE PROGRAMS STOCKPILE STEWARDSHIP
FY 1999 CONGRESSIONAL BUDGET REQUEST
CONSTRUCTION PROJECT SUMMARY
(Dollars in Thousands)

Project Number	Project Title	Performance Measure	TEC	Previous Approp	FY 1997 Adjusted Approp	FY 1998 Adjusted Approp	FY 1999 Request	FY 2000 And Beyond
99-D-108	Renovate Existing Roadways, NV	3.5.A	$ 11,005	$ 0	$ 0	$ 0	$ 2,000	$ 9,005
99-D-107	Joint Computational Engineering Laboratory (JCEL), SNL	2.1.A	28,869	0	0	0	1,800	27,069
99-D-106	Model Validation & System Certification Test Center, SNL	3.1.A	18,219	0	0	0	1,600	16,619
99-D-105	Central Health Physics Calibration Fac, LANL	3.1.A	3,900	0	0	0	3,900	0
99-D-104	Protection of Real Property-Roof Reconstruction-Phase II, LLNL	3.1.A	19,900	0	0	0	7,300	12,600
99-D-103	Isotope Sciences Facilities, LLNL	3.1.A	19,400	0	0	0	4,000	15,400
99-D-102	Rehabilitation of Maintenance Facility, LLNL	3.1.A	7,900	0	0	0	6,500	1,400
97-D-102	DARHT Facility, LANL	2.2.B	259,700	81,400	0	46,300	36,000	96,000
96-D-111	National Ignition Facility, LLNL	2.2.A	1,045,700	37,400	131,900	197,800	284,200	394,400
96-D-105	Contained Firing Facility Addition, LLNL	3.1.A	49,700	6,600	17,100	19,300	6,700	0

Project Number	Project Title	Performance Measure	TEC	Previous Approp	FY 1997 Adjusted Approp	FY 1998 Adjusted Approp	FY 1999 Request	FY 2000 And Beyond
96-D-104								
	Processing & Environmental Technology Laboratory, SNL	3.1.A	45,900	1,980	14,100	0	18,920	10,900
96-D-103								
	Atlas, LANL	2.3.Other	43,300	8,400	15,100	13,400	6,400	0
96-D-102								
	S. Stewardship Facilities Revitalization, Phase VI, VL							
	Water Well Replacements, LANL	3.1.A	16,800	1,000	10,200	4,500	1,100	0
	Fire Protection Improvements, LANL	3.1.A	16,900	1,520	5,050	5,450	4,880	0
	Real Property Protection (Roofs), LLNL	3.1.A	7,810	0	3,000	4,810	0	0
	138 kV Substation Modernization, NTS	3.5.A	11,992	0	1,000	2,667	2,667	5,658
	Storm Drain, Sanitary Sewer, & Domestic Water, SNL	3.1.A	15,374	0	0	1,483	7,326	6,565
	Site 300 Fire Station/Medical Fac, LLNL	3.1.A	5,350	0	0	900	4,450	0
	Subtotal, 96-D-102		74,226	2,520	19,250	19,810	20,423	12,223
95-D-102								
	CMR Upgrades Project, LANL a/	3.1.A	174,100	52,740	15,000	0	0	0
94-D-102								
	Weapons RD&T Facilities Revitalization, Phase V, VL	3.1.A	36,987	29,200	7,787	0	0	0
88-D-106								
	Weapons RD&T Facilities Revitalization, Phase II, VL	3.1.A	307,359	303,959	3,400 b/	0	0	0
TOTAL,								
	Weapons Stockpile Stewardship Construction		$ 2,146,165	$ 524,199	$ 223,637	$ 296,610	$ 399,743	$ 595,616

a/ Funding for the CMR Upgrades Project was transferred to the Stockpile Management decision unit beginning in FY 1998.

b/ Represents use of prior year balances necessary to fund reprogramming 96R44 for the Defense Engineering Laboratory, SNL, Livermore.

WEAPONS STOCKPILE STEWARDSHIP
CORE STOCKPILE STEWARDSHIP

The Core Stockpile Stewardship Program supports the maintenance of a high level of confidence in the safety, reliability, and performance of the U.S. weapons stockpile in the absence of underground nuclear testing. The program provides the physical and intellectual infrastructure required to meet the programmatic requirements of the science-based Stockpile Stewardship program. Primary locations of activity are the Lawrence Livermore, Los Alamos and Sandia National Laboratories and the Nevada Test Site. The Stockpile Stewardship and Management Plan provides primary programmatic guidance.

ONGOING ACTIVITIES:

- Maintain a fully capable physical and intellectual infrastructure for the enduring stockpile;
- Maintain and enhance an effective stockpile surveillance and evaluation program, including preventive maintenance for the stockpile, to offset the lack of nuclear testing;
- Continue to provide and enhance the engineering and development capabilities, including computing and experimental simulation, required to refurbish and recertify the enduring stockpile;
- Maintain the capability to resume underground nuclear testing, if directed; and
- Retain the ability to develop and support the manufacturing of replacement designs.

SIGNIFICANT CHANGES FROM FY 1998:

+ $ 105.6 million	Continue planned growth in the Accelerated Strategic Computing Initiative.
+ $ 31.0 million	Institute the Numeric Environment for Weapon Simulation initiative.
+ $ 5.3 million	Increase to Stockpile Computing.
+ $ 15.8 million	Increased funding for Core Research and Advanced Technology, mainly associated with peformance assessment, physics and advanced hydrodynamic research.
+ $ 61.9 million	Transfer of Waste Management activities at the Los Alamos and Sandia National Laboratories from the Office of Environmental Management.
+ $ 16.7 million	Support four new infrastructure construction line items and three new programmatic construction line items.
+ $ 5.2 million	Security Clearances.
+ $ 84.5 million	Peak year of construction funding for NIF (+$84.5 million), offset by a minor decrease (-$1.9 million) in Operations and Maintenance funding (NIF Other Project Costs are decreased by $24.5 million, ICF base program is increased by $22.6 million).
+ $ 4.2 million	Support Technology Partnerships and Education at the FY 1998 level of effort.

In addition, the FY 1999 budget reflects the selection by the Department of the technology for the second axis of DARHT. During FY 1997, a

technology options study investigated several alternatives and, in September 1997, the Long-Pulse Linear Induction Accelerator was chosen because it represents the greatest technological advancement for the lowest cost and least risk. The TEC will, however, increase by $73 million from the planning estimate which had assumed that the second axis would be a duplication of the first axis technology. The second machine will be capable of providing four high-quality beam pulses over four microseconds with each pulse comparable in quality to the single pulse machine in the first axis. This represents a significant and, in the absence of underground testing, necessary increase in technical capability over the first axis machine.

New Departmental Security Clearance Funding Policy - In FY 1999, the Department will divide funding responsibility for obtaining and maintaining security clearances. The Office of Security Affairs, which has been responsible for funding all Federal and contractor employee clearances, will pay for clearance of Federal employees, both at headquarters and the field, as well as contractors at headquarters. Defense Programs will now be responsible for clearances of contractors in the field who directly support the DP mission, using program funds. This change in policy will enable program managers to make the decision as to how many and what level clearances are necessary for effective program execution.

BUDGET CONTENTS:

The Core Stockpile Stewardship program has five major funding categories:

- **PROGRAMS & INITIATIVES** supports direct stockpile activities and other discrete, high profile initiatives.
- **CORE RESEARCH & ADVANCED TECHNOLOGY** supports long-term science and technology required for an ongoing stockpile requirements response capability.
- **TESTING CAPABILITIES AND READINESS** ensures the continuing availability of the experimental and infrastructure capabilities of the Nevada Test Site as well as maintaining, per Presidential direction, a readiness to resume underground nuclear testing.
- **LABORATORY CAPITAL EQUIPMENT/GENERAL PLANT PROJECTS/Other INFRASTRUCTURE** supports the maintenance of the physical infrastructure of the laboratories.
- **CONSTRUCTION LINE ITEMS**

DIRECT STOCKPILE ACTIVITIES provide for preproduction design and engineering activities including initial design and development of all new weapon designs, if needed; the design and development of weapon modifications; the technical aspects of the laboratory surveillance and flight test program; the analysis behind safety studies and assessments; studies and research to apply basic science to weapon problems producing new technologies, products and processes; command, control, and surety (safety, security, and use control) technology development and implementation; and the analysis needed to dismantle and safely store weapons being removed from the stockpile. These activities are conducted at the three nuclear weapons laboratories (Los Alamos, Lawrence Livermore, and Sandia National Laboratories). Subelements include the **Stockpile Readiness Program**, which includes activities on stockpile weapons to maintain or expand the understanding on the original development work, assess current reliability and safety status, respond to design issues and questions, and support the multi-agency Project Officers Group for each weapon system. The other major Stockpile Stewardship effort is the **Enduring Stockpile Program**, which includes refurbishment efforts like the W87 Peacekeeper Life Extension Program (LEP) to continue the development work necessary to support first production and certification in FY 1999. The **Future Stockpile Program** includes activities directed toward possible future stockpile modifications such as the Submarine Launched Ballistic Missile (SLBM) Warhead Protection Program (WPP), a cooperative program between the Navy and DOE to exercise and maintain expertise for SLBM systems and to demonstrate replacement warhead options for possible future deployment, if needed. The **Stockpile Reduction Program** develops dismantlement procedures, provides liaison and technical support, and assists in the dismantlement of weapons and components designed by their respective laboratory.

FY 1997 PERFORMANCE AGREEMENT:

Completing initial risk assessments for each enduring stockpile weapon by the end of FY 1997. **Status: Successful**
Completing the W87 Life Extension Program design assessment phase by June 1997. **Status: Successful**
Certifying annually that the stockpile is safe and reliable. **Status: Successful**
Meeting all DoD annual weapons alteration, modification, and surveillance schedules. **Status: Partially Successful** because nuclear component laboratory tests and nonnuclear systems tests were delayed due to Pantex operational issues associated with radiography and mass properties testing.

CHANGE FROM FY 1998: Changes from the FY 1998 program level include increases in activities necessary to support first production and certification of the W87 Life Extension Program (LEP) schedule (+$3.6M), increases in the Submarine Launched Ballistic Missile (SLBM) Warhead Protection Program (+$5.1M), and decreases in Stockpile Reduction Program activities (-$8.7M).

PERFORMANCE MEASURES ($ in Thousands)

Direct Stockpile Activities	FY 1997	FY 1998	FY 1999
Objective 1: Maintain confidence in the safety, reliability, and performance of the nuclear weapons stockpile without nuclear testing.			
Performance Measure: *Meet all scheduled deliveries for stockpile maintenance, surveillance, assessment, and as appropriate, refurbish specific warheads as set forth in the classified Production and Planning Directive.*			
- Support for the Stockpile Readiness Program.	$ 32,384	$ 42,060	$ 46,438
- Support for the Enduring Stockpile Program.	$ 88,752	$ 92,133	$ 93,558
Other future stockpile activities.			
- Support for the Future Stockpile Program.	$ 22,822	$ 23,331	$ 27,097
Performance Measure: *Certify that standards for the safety, reliability, and performance of the nuclear weapons stockpile are met.*			
- Conduct technical review of stockpile weapons including evaluation of surveillance results, weapons appraisals, safety evaluations, surety assessments, and reliability reports.	$ 2,471	$ 1,469	$ 1,243
Performance Measure: *Revalidate the military characteristics of the W76 warhead in FY 1999 and begin revalidation of a second weapon type.*			
- Revalidation activities by team members from Lawrence Livermore National Laboratory.	$ 5,450	$ 5,013	$ 6,000
- Revalidation activities by team members from Sandia National Laboratories.	$ 2,500	$ 2,400	$ 2,400
Objective 2: Replace nuclear testing with a science-based Stockpile Stewardship and Management Program.	$ 0	$ 0	$ 0
Objective 3: Ensure the vitality of DOE's national security enterprise.	$ 0	$ 0	$ 0

Objective 4: Reduce nuclear weapons stockpiles and the proliferation threat caused by possible diversion of nuclear materials. **Performance Measure**: *Adhere to schedules for the safe and secure dismantlement of about 500 nuclear warheads that have been removed from the U.S. nuclear weapons stockpile.* - Develop dismantlement procedures, provide liaison and technical support.	$ 12,602	$ 14,585	$ 5,925
TOTAL, Direct Stockpile Activities	**$ 166,981**	**$ 180,991**	**$ 182,661**

EXPERIMENTAL ACTIVITIES provide data to maintain certification of the current stockpile and gain an understanding of stockpile aging and effects on reliability through experiments using high explosives or small quantities of special nuclear material. Experiments are conducted at the three nuclear weapons laboratories (Los Alamos, Lawrence Livermore, and Sandia National Laboratories) and at the Nevada Test Site (NTS). The experiments at the NTS also directly support Presidential direction to maintain the ability to conduct an underground nuclear test at the NTS. Funding for the NTS contractors who support these experiments is included in the **Testing Capabilities and Readiness** budget category. Subelements include: **Archiving, Nuclear Component Assessment, and Nonnuclear Component Assessment. Archiving** includes the identification and preservation of information on stockpile weapon design parameters, production and engineering data, and data from nuclear and nonnuclear tests. This information facilitates the certification of the current stockpile weapons. **Nuclear Component Assessment** supports experiments using hydrodynamic techniques, with and without special nuclear materials, which assess a limited dimension of physical phenomena. With the moratorium on underground nuclear testing, scientists and engineers compare experimental data with data from prior underground nuclear tests in order to validate or modify computational codes. **Nonnuclear Component Assessment** supports aboveground experiments which are used to assess and certify nonnuclear stockpile weapons subsystems and component hardware to neutron, x-ray, and gamma-radiation.

FY 1997 PERFORMANCE AGREEMENT: Certifying annually that the stockpile is safe and reliable. **Status: Successful**

CHANGE FROM FY 1998: Changes from FY 1998 include increases in archiving in support of annual certification.

PERFORMANCE MEASURES ($ in Thousands)

Experimental Activities	FY 1997	FY 1998	FY 1999
Objective 1: Maintain confidence in the safety, reliability, and performance of the nuclear weapons stockpile without nuclear testing. **Performance Measure**: *Certify that standards for the safety, reliability, and performance of the nuclear weapons stockpile are met.*			
- Archiving of nuclear design database and data for nuclear weapon analysis.	$ 4,447	$ 5,145	$ 8,607
- Conduct hydrotest experiments in support of certification.	$ 5,550	$ 5,459	$ 5,535
- Conduct technical review of stockpile weapons including evaluation of surveillance results, weapons appraisals, safety evaluations, surety assessments, and reliability reports.	$ 12,920	$ 14,024	$ 14,222
Objective 2: Replace nuclear testing with a science-based Stockpile Stewardship and Management Program.	$ 0	$ 0	$ 0
Objective 3: Ensure the vitality of DOE's national security enterprise. **Performance Measure**: *The capability to resume underground testing is maintained, in accordance with Presidential direction.*			
- Support NTS personnel to conduct diagnostic development and support AGEX activities.	$ 4,935	$ 6,503	$ 5,185
- Archiving in support of test readiness.	$ 2,835	$ 1,790	$ 1,400
Objective 4: Reduce nuclear weapons stockpiles and the proliferation threat caused by possible diversion of nuclear materials.	$ 0	$ 0	$ 0
TOTAL, Experimental Activities	**$ 30,687**	**$ 32,921**	**$ 34,949**

ACCELERATED STRATEGIC COMPUTING INITIATIVE: ASCI is a 15-year program (FY 1996 - 2010) supporting Defense Programs' response to the Presidential decision to pursue a zero yield Comprehensive Test Ban Treaty. ASCI is a balanced program comprised of the following integrated strategies: (1) Advanced Applications; (2) Platforms; (3) Problem Solving Environments; (4) Strategic Alliances; and (5) One Program\ Three Laboratories. In addition, two new strategies are planned for FY 1999, Validation and Verification and Distributed Computing at a Distance. These strategies, taken collectively, are being pursued to accelerate the development of simulation codes, computer platforms and computing environments needed to address the challenges of credibly simulating the performance, safety, and reliability of the enduring nuclear stockpile. The ASCI program has developed high end simulation capabilities needed to meet weapons assessment and certification requirements without nuclear testing. The supercomputers and facilities developed under the ASCI program, along with associated diagnostic, modeling, and validation technologies, are key to supporting the execution of the Stockpile Stewardship and Management Program. ASCI works closely with U.S. industry to accelerate its plans to provide computer systems far exceeding current industry projections, but essential to Stockpile Stewardship. ASCI will engage U.S. universities on critical simulation capability problems addressing physics, materials modeling, and computer science issues. ASCI builds on and accelerates efforts found in the Stockpile Computing program.

On December 12, 1996, the ASCI (Option Red) supercomputer achieved a new world computing record of 1 Tf (1 trillion floating operations per second). This is nearly 3 times faster than the previous world record.

FY 1997 PERFORMANCE AGREEMENT: Installing the first teraflop platform by September 1997 to begin next generation weapon simulations.
Status: Successful

CHANGE FROM FY 1998: The ASCI program will augment efforts in 3-D code development for both performance and safety codes at each of the labs utilizing capabilities of the Option Blue Machines; new safety / manufacturing codes will also be validated by modeling key safety experiments in a variety of scenarios (storage, accidents, aging stockpile, etc.); provide prototype applications operating in distributed mode, and a unified high performance storage system; coordinate elements of tri-lab computing environment to vertically integrate solid modeling, meshing, parallel decomposition, analysis, and visualization tools; increase problem solving expenditures to support developmental application of ASCI and nuclear weapons production and support codes. Development and application of the 3-D codes requires a powerful problem solving environment, including system software for debugging and performance monitoring, high speed network connectivity. Also in FY 1999, the Option Blue system will be completely installed, and planned performance at 3 Tf level will be undertaken along with enhanced communication of large volumes of data at very high speeds. New efforts and initiatives to be undertaken in FY 1999 include: initiation of the 10-TeraOps (Tf) computer procurement; Distributed Computing at a Distance and the Validation and Verification initiatives--the tools, data and methodologies to ensure high-end simulation capabilities reflect and predict the real world.

PERFORMANCE MEASURES ($ in Thousands)

Accelerated Strategic Computing Initiative	FY 1997	FY 1998	FY 1999
Objective 1: Maintain confidence in safety, reliability, & performance of the nuclear weapons stockpile without nuclear testing	$ 0	$ 0	$ 0
Objective 2: Replace nuclear testing with a science-based Stockpile Stewardship and Management Program.			
Performance Measure: *Accelerate the ongoing development of critical, full-physics, three dimensional weapons simulation codes, specifically perform sustained weapons simulations at one trillion operations per second.*			
- Run six ASCI 3-D codes, 2 performance and 1 safety/manufacturing per Lab, on Blue Machines.	$ 49,596	$ 65,251	$ 86,300
- Validate new safety / manufacturing code by modeling key safety experiments.	$ 0	$ 0	$ 25,000
- Provide elements of tri-lab computing environment, including prototype applications operating in distributed mode, and a unified high performance storage system.	$ 35,994	$ 28,178	$ 36,500
- Vertically integrate solid modeling, meshing, parallel decomposition, analysis, and visualization tools.	$ 37,865	$ 19,000	$ 58,200
- Implement an initial problem solving environment to support developmental application of ASCI and nuclear weapons production and support codes.	$ 21,660	$ 17,100	$ 50,200
Performance Measure: *Complete in FY 1999 the installation of a 3 Tf Option Blue System*			
- Deliver Option Blue Pacific 3.2 Tf system to LLNL.	$ 0	$ 22,170	$ 25,100
- Deliver and Install Option Blue Mountain 3 Tf to LANL.	$ 0	$ 36,080	$ 2,800
Other activities supporting the next generation of supercomputing:			
- Continue Path Forward efforts for contract awards to U.S. firms under the Path Forward strategy to design/develop the 30 Tf supercomputer.	$ 0	$ 7,750	$ 11,500
- Option White (10 Tf) - LLNL.	$ 0	$ 12,500	$ 20,000

Objective 3: Ensure the vitality of DOE's national security enterprise. **Performance Measure**: *Establish strategic alliance and collaborations among the weapons laboratories, industries and universities to enable effective use of scientific and technical personnel throughout the R&D community.* - Continue collaborative activities program for science-based stockpile stewardship.	$ 6,500	$ 15,500	$ 13,500
Objective 4: Reduce nuclear weapons stockpiles and the proliferation threat caused by possible diversion of nuclear materials.	$ 0	$ 0	$ 0
TOTAL, Accelerated Strategic Computing Initiative	**$ 151,615**	**$ 223,529**	**$ 329,100**

SPECIAL PROJECTS: This budget category provides for unique miscellaneous research and development and support activities necessary to carry out the weapons Stockpile Stewardship program, but which do not programmatically fit into any other category. Subelements include **Extraordinary ES&H Site Remediation, Joint DoD/DOE Munitions Technology Development Program, and Other Activities**. **Extraordinary ES&H Site Remediation** activities address one-time prioritized corrective actions that do not meet the funding criteria of the Environmental Restoration and Waste Management program and, therefore, are the responsibility of Defense Programs as the landlord at the three weapons laboratories and the Nevada Test Site. Examples include decontamination, decommission and demolition of surplus facilities at SNL, and the "re-canning" of stored plutonium at LLNL under Defense Nuclear Facilities Safety Board Recommendation 94-1. The **Joint DoD/DOE Munitions Technology Development Program** leverages the funds and resources of the Department of Defense and the DOE to improve the capabilities of nonnuclear munitions in areas of mutual interest between the two agencies. Activities are coordinated through a 5-year plan that is updated and approved annually by both agencies. **Other Activities** include activities which do not fit easily into other budget categories, or for which special visibility is required. For FY 1999, the budget request for this category includes funding for waste management activities transferred to DP by the Office of Environmental Management and security investigations for contractor personnel. During the execution of the FY 1999 budget, these costs will be distributed to the appropriate B&R category as they are incurred.

CHANGE FROM FY 1998: Changes from FY 1998 include the transfer of funding and responsibility for waste management activities at SNL and LANL from the Office of Environmental Management, as well as the transfer of responsibility for security investigations for contractor personnel in the field who directly support the DP mission (these clearances will now be paid from DP program funds).

PERFORMANCE MEASURES ($ in Thousands)

Special Projects	FY 1997	FY 1998	FY 1999
Objective 1: Maintain confidence in the safety, reliability, and performance of the nuclear weapons stockpile without nuclear testing. **Performance Measure**: *Meet all scheduled deliveries for stockpile maintenance, surveillance, assessment, and as appropriate, refurbish specific warheads as set forth in the classified Production and Planning Directive.* - Provide field engineering support, training of military personnel, and maintenance of the Joint Nuclear Weapons Publication System as provided for in the DoD/DOE Munitions MOU.	$ 6,000	$ 5,359	$ 4,869
Objective 2: Replace nuclear testing with a science-based Stockpile Stewardship and Management Program. **Other experimental and theoretical research**. - DoD/DOE Munitions MOU and miscellaneous research and development.	$ 14,461	$ 11,737	$ 11,233
Objective 3: Ensure the vitality of DOE's national security enterprise. **Performance Measure**: *All facilities required for successful achievement of the Stockpile Stewardship and Management Plan are operational.*			
- ES&H activities at SNL.	$ 633	$ 662	$ 0
- Waste Management activities at LANL.	$ 0	$ 0	$ 42,127
- Waste Management activities at SNL.	$ 0	$ 0	$ 17,507
- Pollution prevention activities.	$ 0	$ 0	$ 2,280
- Security investigations for contractor personnel in the field who directly support the DP mission.	$ 0	$ 0	$5,208
Performance Measure: *Continue, in FY 1999, material protection, control, and accountability upgrades at three DOE facilities with weapons-usable material.* - Complete ash stabilization and packaging, and begin stabilization of other material at Superblock.	$ 1,254	$ 0	$ 0
Objective 4: Reduce nuclear weapons stockpiles and the proliferation threat caused by possible diversion of nuclear materials.	$ 0	$ 0	$ 0
TOTAL, Special Projects	**$ 22,348**	**$ 17,758**	**$ 83,224**

PERFORMANCE ASSESSMENT SCIENCE & TECHNOLOGY: These elements, which commonly include theoretical and experimental weapons physics research and are computationally intense activities, emphasize anticipated future national security missions and requirements. Concepts and technologies that offer potential options for meeting future national security requirements and missions are explored, and sometimes, although not always, are prototyped to assess or demonstrate conceptual feasibility. Intensive computational analysis is often required. Also included are the technical reviews of stockpile weapons conducted in support of the annual certification process. Current areas of interest include subcritical experiments, hydrotest and pulsed power experiments, and advanced hydrotest and pulsed power research. Subelements include **Performance Assessment, Physics, Los Alamos Neutron Science Center, and Advanced Hydrodynamic Radiography.**

Performance Assessment explores concepts and technologies that offer potential options for meeting future national security requirements. Although these activities do not involve formal hardware development, they may include a limited amount of prototyping or experimentation to assess or demonstrate conceptual feasibility and they often require intensive computational analysis.

Physics supports basic weapons physics research for both nuclear and nonnuclear components, radiation source development, development of improved diagnostics for use in aboveground experimental facilities. Physics issues involving hydrodynamics, radiation physics, plasma physics, nuclear physics, solid state physics, optical physics, and chemical physics are being addressed to improve physics understanding and code validation, and to sustain the skills of theoretical and experimental scientists. Weapons-related physics experiments on inertial fusion facilities is also supported. Pulsed power experiments are conducted on Pegasus, PBFA-Z, Atlas, and Saturn; hydrotest experiments are conducted at PXR and Phermex. **Subcritical experiments** are scientific experiments using chemical high explosives to generate high pressures which are applied to nuclear materials. High speed measurement instruments are used to obtain valuable scientific data of the behavior of those nuclear materials under conditions similar to those during the implosion phase of a nuclear weapon. The configuration and quantities of explosives and nuclear materials are designed so that no nuclear explosion will take place. The data obtained from subcritical experiments will help benchmark complex computer simulations of nuclear weapons performance that will be used to certify the safety and reliability of the Nation's nuclear weapons stockpile, without nuclear testing.

The **Los Alamos Neutron Science Center** (LANSCE) uses neutron scattering techniques to conduct weapon hydrodynamic studies and provides a new source of critical data in the detection of small-scale material defects which might serve as indicators of weapon component aging (deterioration/damage) and in the prediction of material performance. LANSCE is being improved to combine the LANSCE accelerator facility with the development of new experimental instrumentation (funded by Energy Research). This improvement will be completed in FY 2000.

The **Advanced Hydrodynamic Radiography** program supports research to address the need for an advanced hydrodynamic radiography capability to provide information about weapon implosions. This capability must satisfy three key requirements: 1) accurate density profile measurements of the

interior of a thick object, 2) multiple views of that object, and 3) multiple time exposures along some views. Several candidate technologies for an advanced hydrotest facility are being pursued leading to a decision on an Advanced Hydrotest Facility within 5 years.

FY 1997 PERFORMANCE AGREEMENT: Conducting key stewardship experiments on the Los Alamos Neutron Science Center (LANSCE) to a) demonstrate the feasibility of high energy proton radiography in submillisecond imaging; b) measure crystallographic texture of stockpile plutonium samples at various stages of aging; and, c) improve the nuclear cross section database of plutonium in support of enhanced archival analysis. **Status: Successful**

Also, in FY 1997, the first and second subcritical experiments, "Rebound" and "Holog," were successfully completed. These experiments provided valuable scientific information about the behavior of nuclear materials during the implosion phase of warhead operation.

CHANGE FROM FY 1998: Increase from FY 1998 reflects: increased focus on physics, both to support the annual certification process and to advance our fundamental understanding of weapons behavior; continuation of advanced hydrodynamic radiography research; and the completion of funding for the LANSCE Short-Pulse Spallation Source Accelerator Enhancement Project.

PERFORMANCE MEASURES: ($ in Thousands)

Performance Assessment Science & Technology	FY 1997	FY 1998	FY 1999
Objective 1: Maintain confidence in the safety, reliability, and performance of the nuclear weapons stockpile without nuclear testing.			
Performance Measure: *Meet all scheduled deliveries for stockpile maintenance, surveillance, assessment, and as appropriate, refurbish specific warheads as set forth in the classified Production and Planning Directive.*			
- Support for the phenomenology of the Stockpile Life Extension Program.	$ 1,000	$ 0	$ 0
Performance Measure: *Certify that standards for the safety, reliability, and performance of the nuclear weapons stockpile are met.*			
- Conduct hydrotest experiments in support of certification.	$ 1,944	$ 4,595	$ 5,300
- Conduct technical review of stockpile weapons including evaluation of surveillance results, weapons appraisals, safety evaluations, surety assessments, and reliability reports.	$ 18,832	$ 22,390	$ 34,344
Performance Measure: *Revalidate the military characteristics of the W76 warhead in FY 1999 and begin revalidation of a second weapon type.*			
- Revalidation activities by team members from Los Alamos National Laboratory.	$ 5,700	$ 7,719	$ 6,600

Objective 2: Replace nuclear testing with a science-based Stockpile Stewardship and Management Program.			
Performance Measure: *Make the decision within the five year period whether to construct an advanced hydrodynamic facility and/or an advanced pulsed power facility.*			
- Conduct linear induction accelerator design technology study.	$ 2,500	$ 11,000	$ 12,000
- Demonstrate the utility of inductive voltage adder technology.	$ 0	$ 2,990	$ 12,000
- Develop proton radiography as a technology option for a future Advanced Hydrotest Facility.	$ 2,500	$ 6,484	$ 12,000
- Conduct pulsed power research for potential advanced pulsed power facility.	$ 14,300	$ 24,146	$ 13,000
Performance Measure: *In FY 1999, conduct three to four subcritical experiments at the Nevada Test Site (NTS) to provide valuable scientific information about the behavior of nuclear materials during the implosion phase of a nuclear weapon.*			
- Los Alamos National Laboratory is responsible for one to two subcritical experiments in FY 1999.	$ 5,735	$ 21,000	$ 12,000
- Lawrence Livermore National Laboratory is responsible for one to two subcritical experiments in FY 1999.	$ 4,000	$ 9,200	$ 8,100
Other experimental and theoretical research:			
- Conduct radiation flow, hydrodynamic, and equations of state experiments.	$ 80,408	$ 72,444	$ 96,550
- Conduct research on LANSCE and complete funding for the LANSCE Short-Pulse Spallation Source Accelerator Enhancement Project.	$ 37,160	$ 41,300	$ 46,300
- Establish basis for model validation and system certification.	$ 14,560	$ 7,000	$ 13,100
- Systems engineering and component research, including radiation-hardened components and microsystems.	$ 13,440	$ 13,979	$ 12,182

Objective 3: Ensure the vitality of DOE's national security enterprise **Performance Measure**: *Establish strategic alliance and collaborations among the weapons laboratories, industries and universities to enable effective use of scientific and technical personnel throughout the R&D community.* - Continue support for independent investigator grants in high energy density science relevant to stockpile stewardship. **Performance Measure**: *All facilities required for successful achievement of the Stockpile Stewardship and Management Plan are operational.* - Maintain infrastructure and plant at LLNL, specifically the Big Explosives Experimental Facility and Site 300.	$ 0 $ 10,091	$ 1, 000 $ 10,362	$ 1,500 $ 13,070
Objective 4: Reduce nuclear weapons stockpiles and the proliferation threat caused by possible diversion of nuclear materials.	$ 0	$ 0	$ 0
TOTAL, Performance Assessment Science & Technology	**$ 212,170**	**$ 255,609**	**$ 298,046**

SYSTEMS COMPONENTS SCIENCE & TECHNOLOGY: This budget category supports research program elements which emphasize the integration of warhead systems with delivery systems, and advancement of subsystem enabling technologies. Research includes component modularity, standardization, and reuse; utilization of microelectronic systems to improve safety, security and reliability; and development of the tools, methods, and processes needed to support future design and manufacturing requirements.

Subelements include: **Systems Engineering; Electronics, Photonics, Sensors & Mechanical Components;** and **Advanced Manufacturing. Systems Engineering** activities facilitate the incorporation of new technologies into weapon systems and stockpile stewardship operations. **Electronics, Photonics, Sensors and Mechanical Components** supports research in enabling technologies which control and operate nuclear weapons including intelligent systems which monitor and diagnose the condition of weapons with regard to aging, functional status, intrusion/tamper detection, and anticipated performance. **Advanced Manufacturing** efforts develop the cost-effective, environmentally acceptable product realization tools, methods, and processes in direct support of the nuclear weapons stockpile.

CHANGE FROM FY 1998: Decrease is attributable to a one-time add-on of $15 million in the FY 1998 appropriation for Systems Engineering, directed to radiation hardened microelectronics.

PERFORMANCE MEASURES: ($ in Thousands)

Systems Components Science & Technology	FY 1997	FY 1998	FY 1999
Objective 1: Maintain confidence in the safety, reliability, and performance of the nuclear weapons stockpile without nuclear testing.	$ 0	$ 0	$ 0
Objective 2: Replace nuclear testing with a science-based Stockpile Stewardship and Management Program. **Other experimental and theoretical research:** - Systems engineering and component research, including radiation-hardened components and microsystems. - Conduct nonnuclear component research in all normal and abnormal environments.	 $ 36,248 $ 64,000	 $ 47,604 $ 62,006	 $ 30,035 $ 52,093
Objective 3: Ensure the vitality of DOE's national security enterprise. **Performance Measure**: *All facilities required for successful achievement of the Stockpile Stewardship and Management Plan are operational.* - Maintain infrastructure and plant at Lawrence Livermore National Laboratory. **Performance Measure:** *Adhere to schedules set forth in the Advanced Manufacturing, Design and Production Technology Plan.* - Develop advanced manufacturing technologies to reduce occurrence of design and manufacturing defects and the time and cost of product realization.	 $ 2,800 $ 17,329	 $ 0 $ 12,626	 $ 0 $ 16,162
Objective 4: Reduce nuclear weapons stockpiles and the proliferation threat caused by possible diversion of nuclear materials.	$ 0	$ 0	$ 0
TOTAL, Systems Components Science & Technology	**$ 120,377**	**$ 122,236**	**$ 98,290**

CHEMISTRY AND MATERIALS: This category supports research that addresses the unique set of materials science challenges created by the specialized materials developed for, and used in, nuclear weapons, and the associated reliability requirements. These activities are required to address the resolution of weapons aging and reliability issues; to support the remanufacture of stockpile components in a timely, cost effective, and environmentally benign way; and to enhance the reliability and surety of remanufactured components. Subelements include **Chemistry and Materials, High Explosives, Special Nuclear Materials,** and **Tritium. Chemistry and Materials** supports research on materials synthesis and processing, determination of materials structure and composition, and development of functional properties in polymers, metals, ceramics, inorganic and organic materials, composites, and salts. **High Explosives** involves fundamental physics and chemistry of explosive materials, characterization and modeling of explosive properties, improvement of firing technology, investigation of demilitarization technologies, and engineering of explosive component prototypes and their evaluation for weapons use. **Special Nuclear Materials** activities support the development of advanced and automated processing, casting, dynamic testing and machining technologies for beryllium, plutonium, and uranium. The **Tritium** subelement supports research on the production, disassembly, handling, and use of tritium and its compatibility with other materials and components and focuses on four main areas: gas transfer, solid storage systems, neutron generator tubes, and inertial fusion targets.

CHANGE FROM FY 1998: Continues at approximately the FY 1998 program level after considering the Superblock security upgrade.

PERFORMANCE MEASURES ($ in Thousands)

Chemistry & Materials Science & Technology	FY 1997	FY 1998	FY 1999
Objective 1: Maintain confidence in the safety, reliability, and performance of the nuclear weapons stockpile without nuclear testing. **Performance Measure**: *Adhere to schedules set forth in the Enhanced Surveillance Program Plan for activities that enhance knowledge of weapon-relevant physical processes affecting aging and operation of weapon components.* - Conduct Tritium studies.	$ 1,500	$ 1,515	$ 1,947

Objective 2: Replace nuclear testing with a science-based Stockpile Stewardship and Management Program. **Other experimental and theoretical research:** - Conduct chemistry and materials research, including high explosives and special nuclear materials experiments. - Conduct tritium studies.	 $ 43,199 $ 6,347	 $ 40,223 $ 3,977	 $ 40,078 $ 3,586
Objective 3: Ensure the vitality of DOE's national security enterprise. **Performance Measure**: *All facilities required for successful achievement of the Stockpile Stewardship and Management Plan are operational.* - Maintain infrastructure and plant at Lawrence Livermore National Laboratory, specifically the High Explosives Application Facility. **Performance Measure**: *Continue, in FY 1999, material protection, control, and accountability upgrades at three DOE facilities with weapons-usable material.* - Complete implementation of Superblock security upgrade.	 $ 11,167 $ 7,200	 $ 11,845 $ 7,700	 $ 10,930 $ 6,073
Objective 4: Reduce nuclear weapons stockpiles and the proliferation threat caused by possible diversion of nuclear materials.	$ 0	$ 0	$ 0
TOTAL, Chemistry & Materials Science & Technology	**$ 69,413**	**$ 65,260**	**$ 62,614**

STOCKPILE COMPUTING: Supports the development, enhancement, and maintenance of simulation codes and databases for the weapons program and research in theoretical physics, mathematical modeling, software and algorithms. These activities are essential in weapon safety and reliability assessments, stockpile life extension endeavors, design of physics experiments, developing appropriate diagnostics, and analyzing past nuclear experimental results. Areas of current interest include: assessments of complex/unique accident scenarios; improvements of predictive capability for weapon safety and performance analysis, particularly in support of science-based Stockpile Stewardship; improvement in weapon materials dynamic response models; multi-dimensional simulation of physics; visualization tools; and robotics algorithms. The Stockpile Computing mission is to conduct computing operations, models development and code maintenance to support execution of the Stockpile Stewardship and Management Program. Stockpile Computing is managed to be consistent with, and supportive of, developments achieved through the Accelerated Strategic Computing Initiative (ASCI). Ongoing Stockpile Computing activities include hardware and software maintenance; computer operations; system administration, support and integration; configuration and resource management; computer security; local upgrades to operating systems and utility software. System networks will continue to be upgraded to enhance data transfer speeds and data storage continue to expand as technology for high density storage advances.

CHANGE FROM FY 1998: Continue core computational efforts with emphasis on enhancements to codes in physics research, improved diagnostics, and the development of new codes for mathematical modeling. Critical activities planned for the budget period include: maintenance of legacy codes to support the assessment, certification and validation of new codes and provision of a test-validated computational test bed for advanced physics issues; coupled with a new initiative to be undertaken in FY 1999. New mathematical codes will be implemented in a new Stockpile Computing initiative entitled the Numeric Environment for Weapon Simulation, (NEWS). This initiative will provide the computational and computer infrastructure which combines simulation codes and platforms with the problem solving tools and visualization tools to form a distributed high-end computing environment for weapons assessment.

PERFORMANCE MEASURES ($ in Thousands)

Stockpile Computing	FY 1997	FY 1998	FY 1999
Objective 1: Maintain confidence in the safety, reliability, and performance of the nuclear weapons stockpile without nuclear testing. **Performance Measure**: *Certify that standards for the safety, reliability, and performance of the nuclear weapons stockpile are met.* - Perform weapon simulation/calculations in support of certification.	$ 37,034	$ 28,572	$ 54,800

Objective 2: Replace nuclear testing with a science-based Stockpile Stewardship and Management Program. **Performance Measure**: *Accelerate the ongoing development of critical, full-physics, three dimensional weapons simulation codes, specifically perform sustained weapons simulations at one trillion operations per second.* - Perform simulation code development and validation and continue improvements in 3-D full physics modeling involving an increasing number of designers simultaneously. **Other activities supporting the next generation of supercomputing:** - Continue collaborations with the ASCI program for science-based stockpile stewardship through code maintenance, and problem solving environments, supercomputer system administration, support and integration. **Other experimental and theoretical research:** - Maintain modeling and simulation efforts and embark on the Numeric Environment for Weapon Simulation initiative.	$40,245 $ 20,000 $ 57,866	$ 65,139 $ 16,310 $ 40,539	$ 64,400 $ 22,900 $ 44,800
Objective 3: Ensure the vitality of DOE's national security enterprise.	$ 0	$ 0	$ 0
Objective 4: Reduce nuclear weapons stockpiles and the proliferation threat caused by possible diversion of nuclear materials.	$ 0	$ 0	$ 0
TOTAL, Stockpile Computing	**$ 155,145**	**$ 150,560**	**$ 186,900**

TESTING CAPABILITIES AND READINESS: The primary purpose of the Nevada Test Site (NTS) is to provide a continental U.S. site for nuclear weapons testing. Consistent with Presidential direction, Defense Programs is required to maintain a readiness capability to conduct an underground nuclear test at the NTS within 2-3 years, if needed. In addition to maintaining the appropriate infrastructure, personnel knowledge, and skills to meet this requirement, measures are to be taken to assure continued environmental, worker health, public safety, and physical protection. Presidential direction also provides that sufficient resources should be included to conduct experimental activities planned by the three nuclear weapon laboratories (Los Alamos, Lawrence Livermore, and Sandia National Laboratories). Subcritical experiments at the NTS provide valuable scientific information about the behavior of nuclear materials during the implosion phase of a nuclear weapon. In FY 1997, the first and second subcritical experiments, "Rebound" and "Holog," were successfully completed at the Nevada Test Site on July 2 and September 18, 1997. In FY 1998, three to four subcritical experiments are planned. Beginning in FY 1999, three to four subcritical experiments are planned at the Nevada Test Site each year, one to two sponsored by each nuclear weapons design laboratory (LANL and LLNL).

FY 1997 PERFORMANCE AGREEMENT:

Maintaining the Nevada Test Site at a 2-3 year readiness to resume testing. **Status: Successful**

Conducting two subcritical experiments at the Nevada Test Site. **Status: Successful**

CHANGE FROM FY 1998: Changes from FY 1998 include increased support needed for three to four subcritical experiments which are expected to be more complex than previous experiments, and a one time expense to upgrade the radio system at the NTS.

PERFORMANCE MEASURES ($ in Thousands)

Testing Capabilities and Readiness	FY 1997	FY 1998	FY 1999
Objective 1: Maintain confidence in the safety, reliability, and performance of the nuclear weapons stockpile without nuclear testing.	$ 0	$ 0	$ 0

Objective 2: Replace nuclear testing with a science-based Stockpile Stewardship and Management Program. **Performance Measure**: *In FY 1999, conduct three to four subcritical experiments at the Nevada Test Site (NTS) to provide valuable scientific information about the behavior of nuclear materials during the implosion phase of a nuclear weapon.* - NTS will provide support to the nuclear weapons laboratories in the areas of technical, engineering, scientific, and construction expertise necessary to field and conduct three to four subcritical experiments in FY 1999. - Sandia National Laboratories will provide support to the Nuclear Weapons Design Laboratories and NTS personnel in the arming and firing of subcritical experiments.	$ 28,882 $ 1,500	$ 50,246 $ 2,000	$ 59,965 $ 2,000
Objective 3: Ensure the vitality of DOE's national security enterprise. **Performance Measure**: *The capability to resume underground testing is maintained, in accordance with Presidential direction.* - Activities maintaining the appropriate infrastructure, personnel knowledge and exercised skills necessary to conduct an underground nuclear test within 2-3 years.	$ 135,638	$ 128,182	$ 121,935
Objective 4: Reduce nuclear weapons stockpiles and the proliferation threat caused by possible diversion of nuclear materials.	$ 0	$ 0	$ 0
TOTAL, Testing Capabilities and Readiness	**$ 166,020**	**$ 180,428**	**$ 183,900**

STOCKPILE STEWARDSHIP CAPITAL EQUIPMENT/GPP/OTHER INFRASTRUCTURE:
This budget category is evolving from exclusively capital equipment and general plant projects (GPP) activities in the past to instititutional and infrastructure activities in Fy 1998 and FY 1999. Beginning in FY 1996, the Operations & Maintenance account includes both capital equipment and GPP as well as operating expenses. The requirement to specifically budget for capital equipment and GPP has been eliminated. Therefore, the FY 1997 funding reflects actual obligations for capital equipment and GPP as expended by the three national laboratories and the Nevada Test Site. The FY 1998 and FY 1999 funding supports capital equipment, GPP, and operating expense funded activities which support institutional and infrastructure requirements needed Funding in this category supports multiple laboratory programs or is of a basic infrastructure nature and therefore cannot be allocated to other Stockpile Stewardship operations and maintenance categories.

CHANGE FROM FY 1998: Decrease is attributable to the $30 million add-on in the FY 1998 appropriation, specificially for infrastructure activities at the laboratories and the Nevada Test Site (NTS).

PERFORMANCE MEASURES ($ in Thousands)

Stockpile Stewardship Capital Equipment/GPP/Infrastructure	FY 1997	FY 1998	FY 1999
Objective 1: Maintain confidence in the safety, reliability, and performance of the nuclear weapons stockpile without nuclear testing.	$ 0	$ 0	$ 0
Objective 2: Replace nuclear testing with a science-based Stockpile Stewardship and Management Program.	$ 0	$ 0	$ 0
Objective 3: Ensure the vitality of DOE's national security enterprise. **Performance Measure**: *All facilities required for successful achievement of the Stockpile Stewardship and Management Plan are operational.* - Provide laboratory and NTS capital equipment, general plant projects, and other infrastructure activities. **Performance Measure:** *The capability to resume underground testing is maintained, in accordance with Presidential direction.* - Provide NTS capital equipment, general plant projects, and other infrastructure activities.	$ 37,814 $ 0	$ 46,812 $ 5,000	$ 46,148 $ 0

Objective 4: Reduce nuclear weapons stockpiles and the proliferation threat caused by possible diversion of nuclear materials.	$ 0	$ 0	$ 0
TOTAL, Stockpile Stewardship Capital Equipment/GPP/Other Infrastructure	**$ 37,814**	**$ 51,812**	**$ 46,148**

STOCKPILE STEWARDSHIP CONSTRUCTION:

The programmatic and infrastructure construction projects that support the DP mission at the three nuclear weapons laboratories and the Nevada Test Site are included within this budget category, with the exception of the National Ignition Facility, which is included with the Inertial Confinement Fusion program of which it is an integral part. Details for all of the construction projects are included in the construction project datasheets. A summary list of all the projects follows this page.

FY 1997 PERFORMANCE AGREEMENT: Meeting Dual Axis Radiographic Hydrodynamic Test (DARHT) facility construction milestones by a) selecting technology and determining scope of the second axis by June 1997. **Status: Partially successful** due to delay until September of technology selection; b) completing 3/4 of the hydrotest firing site by September 1997. **Status: Successful**

CHANGES FROM FY 1998: A new line item is proposed in support of ASCI at SNL with FY 1999 funding of $1.8 million, the Joint Computational Engineering Laboratory (99-D-107). Funding for DARHT declines by $10.3 million as Phase 1 is completed. The funding requested in FY 1999 will continue design and initiate long lead procurement activities for Phase 2. In late September 1997, the long pulse Linear Induction Accelerator generating four high-quality radiographic pulses over two microseconds was selected as the technology for the second axis. This represents a major and, in the absence of underground testing, necessary increase in technical capability over the first axis machine. This budget reflects an increase of $73,000,000 in the total estimated cost (TEC) of DARHT required for the four-pulse x-ray machine; a more extensive discussion of the TEC increase can be found in the construction project datasheet. Funding for Atlas declines by $7 million representing final year of funding for this project. Funding is also requested to initiate four new infrastructure projects. Two of these new starts are proposed for LLNL: the Rehabilitation of Maintenance Facility project (99-D-102) will upgrade the existing facility used for all site maintenance and the Protection of Real Property project (Roof Reconstruction--Phase II) (99-D-104) is the second of three phases of a program to replace roofs at LLNL. One infrastructure project is proposed at LANL: the Central Health Physics Calibration Facility (99-D-105) to consolidate all of the existing LANL health physics calibration functions in one remote location and allow for calibration of instruments to the required high dose levels. And finally, one infrastructure project is proposed at the Nevada Test Site to renovate 37 miles of the Mercury Highway, the primary road at the NTS (99-D-108). In addition, two new programmatic line items are proposed: at SNL, the Model Validation and System Certification Test Center (99-D-106), to consolidate and eliminate a

number of older, obsolete and redundant testing command and control centers; and at LLNL, the Isotope Sciences Facilities project (99-D-103) provides for a major rehabilitation of LLNL's nuclear chemistry facilities. The FY 1999 request also supports all ongoing construction projects.

PERFORMANCE MEASURES ($ in Thousands)

Stockpile Stewardship Construction	FY 1997	FY 1998	FY 1999
Objective 1: Maintain confidence in the safety, reliability, and performance of the nuclear weapons stockpile without nuclear testing.	$ 0	$ 0	$ 0
Objective 2: Replace nuclear testing with a science-based Stockpile Stewardship and Management Program. **Performance Measure**: *Accelerate the ongoing development of critical, full-physics, three dimensional weapons simulation codes, specifically perform sustained weapons simulations at one trillion operations per second.* - Joint Computational Engineering Laboratory (99-D-107) at SNL will be a new state-of-the-art facility for research, development, and application of leading edge, high-end computational and communications technologies.	$ 0	$ 0	$ 1,800
Performance Measure: *Complete Phase 1 of the Dual-Axis Radiographic Hydrodynamic Test Facility (DARHT) and complete Title I, Preliminary Design of the remainder of the Project.* - DARHT's (97-D-102) dual-axis, multi-time viewing capability will provide crucial experimental data on many warheads in the stockpile and, when completed in FY 2002, will be the most capable hydrodynamic testing facility in the complex.	$ 0	$ 46,300	$ 36,000
Other experimental and theoretical research: - Complete funding of Atlas (96-D-103).	$ 15,100	$ 13,400	$6,400

Objective 3: Ensure the vitality of DOE's national security enterprise. **Performance Measure**: *All facilities required for successful achievement of the Stockpile Stewardship and Management Plan are operational.* - Continue ongoing construction and initiate new programmatic and infrastructure projects at the three nuclear weapons laboratories. **Performance Measure**: *The capability to resume underground testing is maintained, in accordance with Presidential direction.* - Continue ongoing construction and initiate a new infrastructure project to renovate the roads at the NTS.	$ 75,637 $ 1,000	$ 36,443 $ 2,667	$ 66,676 $ 4,667
Objective 4: Reduce nuclear weapons stockpiles and the proliferation threat caused by possible diversion of nuclear materials.	$ 0	$ 0	$ 0
TOTAL, Stockpile Stewardship Construction	**$ 91,737**	**$ 98,810**	**$ 115,543**

INERTIAL CONFINEMENT FUSION: The mission of the Inertial Confinement Fusion (ICF) program is twofold: (1) to address high energy density physics issues as a key component of the science-based Stockpile Stewardship program, and (2) to develop a laboratory microfusion capability for defense and energy applications. The near-term goals pursued by the ICF program in support of this mission are demonstrating ignition in the laboratory and expanding the program's capabilities in high energy density science. The National Ignition Facility (NIF) is the cornerstone of this effort.

The specific goals of the national ICF program are to: demonstrate fusion ignition in the laboratory; provide access to physics regimes of interest in nuclear weapon science and investigate physics issues; expand the aboveground simulation capability for nuclear weapons effects; develop diagnostic instruments applicable to weapons stockpile stewardship research; develop and experimentally benchmark computational models by developing three-dimensional simulation capabilities; and, attract and retain highly competent scientists and engineers within the nuclear weapons program.

The ICF program has developed unique capabilities in pursuit of its national mission. The laser and pulsed power facilities developed under the ICF program, along with associated diagnostic, modeling, and target fabrication components, are the most advanced array of high energy density physics research capabilities in the world. These facilities support science based stockpile stewardship while advancing inertial fusion technology toward a laboratory ignition demonstration with multi-megajoule fusion energy yields. Over the next five years, most of the ICF resources are allocated to an integrated theoretical and experimental program (high energy density physics studies, target fabrication, laser science, computation) to advance the technology in support of achieving ignition and preparing for the transition to NIF operations. Demonstration of ignition and burn in the laboratory is the goal of the National Ignition Facility (NIF), which will use glass laser technology and is planned to be completed in FY 2003.

The facilities currently supported by the ICF program are located at Lawrence Livermore National Laboratory (LLNL), Los Alamos National Laboratory (LANL), Sandia National Laboratories (SNL), the University of Rochester's Laboratory for Laser Energetics (UR/LLE) and the Naval Research Laboratory (NRL). They are as follows:

- **Beamlet**: a scientific prototype of one beam of the NIF located at LLNL . It began operating experiments in 1994 and is planned to be shut down during FY 1998.
- **National Ignition Facility (NIF)**: a 192-beam neodymium (Nd) glass laser being built at LLNL and scheduled for completion in FY 2003.
- **Nike**: a Krypton-fluoride (KrF) laser located at NRL. It was completed in FY 1995 and is being used primarily to define beam smoothness requirements for direct drive laser fusion.
- **Nova**: a ten-beam glass laser located at LLNL. It has been the program's major facility for research on indirect drive laser fusion, and has also made important contributions to stockpile stewardship and basic experiments on high energy density physics. This facility has been

operating since 1985 and is planned to be shut down in FY 1999.

- **Omega**: a 60-beam glass laser used primarily for research on direct drive laser fusion located at UR/LLE. This facility was upgraded beginning in FY 1991 and began operating in the upgraded configuration in May 1995. It is the "bridge" facility between Nova and NIF.
- **Z**: a pulsed power machine used for inertial fusion research, located at SNL. It has made many significant scientific breakthroughs since it began operating as a z-pinch device in October 1996 to conduct weapons physics and ignition related experiments.
- **Trident**: a smaller glass laser facility at LANL used for diagnostic testing and development, as well as weapons and basic physics experiments.

FY 1997 PERFORMANCE AGREEMENT: Meeting National Ignition Facility construction milestones: a) site selection by December 1996; b) initiation of site preparation and long lead procurements by March 1997; and, c) remain on schedule to complete project in 3rd quarter of 2003 with total project costs of $1.2 billion. **Status: Successful**

CHANGE FROM FY 1998: FY 1999 is the peak year of construction funding for NIF, with an increase over FY 1998 of $86.4 million. NIF other project costs decrease by $24.5 million in FY 1999 as optics facilitization activities near completion; however, the ICF base program includes increased funding of $22.6 million to support NIF optics pilot production, a backlighter for Z, and increased support for weapons physics shots on Omega.

PERFORMANCE MEASURES ($ in Thousands)

Inertial Confinement Fusion - Operations & Maintenance	FY 1997	FY 1998	FY 1999
Objective 1: Maintain confidence in the safety, reliability, and performance of the nuclear weapons stockpile without nuclear testing.	$ 0	$ 0	$ 0

Objective 2: Replace nuclear testing with a science-based Stockpile Stewardship and Management Program. **Performance Measure**: *Meet all cost and schedule goals for construction of the National Ignition Facility in FY 1999 and related technology development.* - Continue activation/startup planning, assurances and integration activities and complete facilitization of optics vendors in FY 1999 *(NIF Other Project Costs)*. - Start optics pilot production *(ICF program)*. - Complete majority of laser and optics technology development *(ICF program)*. - Transition to NIF operations *(ICF program)*. **Other high energy density research:** - Conduct indirect drive ignition preparation and other related stewardship experiments on ICF laser facilities. - Determine feasibility of NIF direct drive ignition and develop direct drive for use in stewardship. - Conduct pulsed power experiments and technology development. - Deliver required targets to ICF facilities and continue diagnostic and target fabrication development for NIF. - Provide for independent review and technical support for ICF program.	$ 59,200 $ 0 $ 36,832 $ 0 $ 63,598 $ 31,084 $ 26,312 $ 15,721 $660	$ 31,300 $ 11,500 $ 32,100 $ 6,200 $ 56,346 $ 34,913 $ 24,500 $ 16,341 $ 454	$ 6,800 $ 23,800 $ 11,800 $ 28,000 $ 57,457 $ 35,500 $ 31,700 $ 15,043 $ 700
Objective 3: Ensure the vitality of DOE's national security enterprise. **Performance Measure**: *Establish strategic alliances and collaborations among the weapon laboratories, industries and universities to enable effective use of scientific and technical personnel throughout the R&D community.* - Continue support for independent investigator grants in high energy density science relevant to stockpile stewardship.	$ 1,153	$ 2,000	$ 3,000
Objective 4: Reduce nuclear weapons stockpiles and the proliferation threat caused by possible diversion of nuclear materials.	$ 0	$ 0	$ 0
Total, Inertial Confinement Fusion Operations & Maintenance	**$ 234,560**	**$ 215,654**	**$ 213,800**

PERFORMANCE MEASURES ($ in Thousands)

Inertial Confinement Fusion - Construction	FY 1997	FY 1998	FY 1999
Objective 1: Maintain confidence in the safety, reliability, and performance of the nuclear weapons stockpile without nuclear testing.	$ 0	$ 0	$ 0
Objective 2: Replace nuclear testing with a science-based Stockpile Stewardship and Management Program. **Performance Measure**: *Meet all cost and schedule goals for construction of the National Ignition Facility in FY 1999 and related technology development.* - Support engineering design activities and complete Title II detailed design during FY 1999*(NIF line item 96-D-111*). - Continue conventional facilities construction *(NIF line item 96-D-111*). - Continue special equipment procurement/installation *(NIF line item 96-D-111*). - Support integration activities including construction related assurances and project management *(NIF line item 96-D-111*).	$ 69,538 $ 37,216 $ 12,397 $ 12,749	$ 37,567 $ 87,891 $ 58,025 $ 14,317	$ 20,894 $ 33,512 $ 218,000 $11,794
Objective 3: Ensure the vitality of DOE's national security enterprise.	$ 0	$ 0	$ 0
Objective 4: Reduce nuclear weapons stockpiles and the proliferation threat caused by possible diversion of nuclear materials.	$ 0	$ 0	$ 0
Total, NIF Construction	**$ 131,900**	**$ 197,800**	**$ 284,200**
TOTAL, INERTIAL CONFINEMENT FUSION	**$ 366,460**	**$ 413,454**	**$ 498,000**

FY 1999 CONGRESSIONAL BUDGET REQUEST
WEAPONS STOCKPILE STEWARDSHIP
(Dollars in Thousands)

Funding Schedule:

Program Activity	FY 1997	FY 1998	FY 1999	$ Change	% Change
INERTIAL CONFINEMENT FUSION					
OPERATIONS & MAINTENANCE					
Target Physics, Theory, and Modeling	83,159	99,278	124,021	24,743	25%
Target Development, Fabrication, and Handling	29,746	30,049	28,393	(1,656)	-6%
Laser and Optics Technology Development	51,231	46,525	50,278	3,753	8%
National Ignition Facility - Other Project Costs	59,200	31,300	6,800	(24,500)	-78%
Advanced Driver Development	8,783	5,398	0	(5,398)	-100%
Other ICF Activities	2,441	3,104	4,308	1,204	39%
TOTAL, ICF OPERATIONS & MAINTENANCE	$ 234,560	$ 215,654	$ 213,800	$ (1,854)	-1%
National Ignition Facility (96-D-111)	$ 131,900	$ 197,800	$ 284,200	$ 86,400	44%
TOTAL INERTIAL CONFINEMENT FUSION	$ 366,460	$ 413,454	$ 498,000	$ 84,546	20%

FY 1999 CONGRESSIONAL BUDGET REQUEST
WEAPONS STOCKPILE STEWARDSHIP
(Dollars in Thousands)

Funding Schedule by Site:

	FY 1997 Actual			FY 1998 Appropriation			FY 1999 Request		
SITE	ICF Program	NIF TEC & OPC	Total	ICF Program	NIF TEC & OPC	Total	ICF Program	NIF TEC & OPC	Total
INERTIAL CONFINEMENT FUSION									
Lawrence Livermore National Laboratory	84,832	184,320	269,152	90,346	222,170	312,516	101,800	286,550	388,350
Los Alamos National Laboratory	22,044	1,930	23,974	21,921	1,650	23,571	22,500	800	23,300
Sandia National Laboratories	26,312	4,800	31,112	24,500	5,230	29,730	31,700	3,600	35,300
University of Rochester/LLE	22,009	50	22,059	25,913	50	25,963	29,000	50	29,050
Naval Research Laboratory	9,075		9,075	9,000		9,000	9,500		9,500
General Atomics	9,728		9,728	10,520		10,520	9,100		9,100
Oakland Operations Office	914		914	1,700		1,700	2,700		2,700
Headquarters	446		446	454		454	700		700
TOTAL ICF	175,360	191,100	366,460	184,354	229,100	413,454	207,000	291,000	498,000

TECHNOLOGY PARTNERSHIPS: Technology Partnerships (previously Technology Transfer) funding supports cooperative activities between the nuclear weapons complex and the private sector which provide dual benefits to the nuclear weapons program and U.S. industry. The majority of the activities are partnerships called Cooperative Research and Development Agreements (CRADA) which have been selected on the basis of their contribution to the advanced technology needs of the weapons complex, principally at the nuclear weapons laboratories and the weapons production plants at Oak Ridge and Kansas City. These technology partnerships are supportive of a number of Defense Programs Initiatives: the Advanced Manufacturing, Design and Production Technologies Initiative (ADAPT) and core Stockpile Stewardship and Management objectives. Examples of other initiatives are: the American Textile Partnership (AMTEX) for which the Conference on the FY 1997 Energy and Water Development Appropriation provided $10 million; and the Advanced Computational Technology Initiative (ACTI).

CHANGE FROM FY 1998: The FY 1999 funding level maintains the FY 1998 level of effort.

PERFORMANCE MEASURES ($ in Thousands)

Technology Partnerships	FY 1997	FY 1998	FY 1999
Objective 1: Maintain confidence in the safety, reliability, and performance of the nuclear weapons stockpile without nuclear testing.	$ 0	$ 0	$ 0
Objective 2: Replace nuclear testing with a science-based Stockpile Stewardship and Management Program.	$ 0	$ 0	$ 0
Objective 3: Ensure the vitality of DOE's national security enterprise. **Performance Measure:** *Adhere to schedules set forth in the Advanced Design and Production Technology Plan.* -Develop manufacturing technologies to reduce occurrence of design and manufacturing defects and the time and cost of product realization. **Performance Measure**: *Establish strategic alliance and collaborations among the weapons laboratories, industries and universities to enable effective use of scientific and technical personnel throughout the R&D community.* - Continue to support the DP mission through cost-shared collaborations with industrial partners.	$4, 188 $ 55,212	$ 4,000 $ 51,901	$ 0 $ 60,000

Objective 4: Reduce nuclear weapons stockpiles and the proliferation threat caused by possible diversion of nuclear materials.	$ 0	$ 0	$ 0
TOTAL, Technology Partnerships	**$ 59,400**	**$ 55,901**	**$ 60,000**

EDUCATION: The Education program provides funding to utilize the unique resources of the Department of Energy -- people, programs, and facilities -- to improve science and math education throughout the Nation, while supporting the Defense Programs mission. Enhancing the scientific education of our citizens will ensure a highly trained, diverse scientific workforce for the laboratories and will enhance our ability to conduct the Stockpile Stewardship mission. The projects, approved by Headquarters and conducted mainly by the Lawrence Livermore National Laboratory, Los Alamos National Laboratory, and Sandia National Laboratories, ongoing in nature or for a defined period, are grouped in six major categories: teacher/faculty enhancement, curriculum improvement, institutional improvement, student support, educational technology and public understanding of science. Each laboratory publishes an annual report on the projects and their accomplishments. Historically Black Colleges and Universities and other minority institutions receive approximately 15 percent of this funding. Education activities are also conducted through the Albuquerque, Oakland, and Nevada Operations Offices.

CHANGE FROM FY 1998: The FY 1999 program will continue at the FY 1998 level of $9 million with increasing emphasis on graduate and undergraduate activities that have a direct tie to the Defense Programs mission and goals and the core competencies of the laboratories.

PERFORMANCE MEASURES ($ in Thousands)

Education	FY 1997	FY 1998	FY 1999
Objective 1: Maintain confidence in the safety, reliability, and performance of the nuclear weapons stockpile without nuclear testing.	$ 0	$ 0	$ 0
Objective 2: Replace nuclear testing with a science-based Stockpile Stewardship and Management Program.	$ 0	$ 0	$ 0

Objective 3: Ensure the vitality of DOE's national security enterprise. **Performance Measure**: *Establish strategic alliance and collaborations among the weapons laboratories, industries and universities to enable effective use of scientific and technical personnel throughout the R&D community.* - Engage students and professors of colleges and universities (including minority institutions) in DP mission-related research as a means to enhance educational opportunities and build stronger ties to the academic community.	$ 10,000	$ 8,944	$ 9,000
Objective 4: Reduce nuclear weapons stockpiles and the proliferation threat caused by possible diversion of nuclear materials.	$ 0	$ 0	$ 0
TOTAL, Education	**$ 10,000**	**$ 8,944**	**$ 9,000**

DEPARTMENT OF ENERGY
FY 1999 CONGRESSIONAL BUDGET REQUEST

WEAPONS ACTIVITIES
(Tabular dollars in thousands. Narrative material in whole dollars.)

Weapons Stockpile Stewardship

1. Title and Location of Project: Renovate Existing Roadways, Nevada Test Site, Nevada — 2a. Project No.: 99-D-108; 2b. Constructed Funded

	Preliminary Schedule	Title I Baseline	Current Baseline Schedule
3a. Date A-E Work Initiated (Title I Design Start Scheduled):	1st Qtr. FY 1999		
3b. A-E Work (Titles I & II) Duration:	9 months		
4a. Date Physical Construction Starts:	1st Qtr. FY 2000		
4b. Date Construction Ends:	1st Qtr. FY 2001		

	Preliminary Estimate	Title I Baseline	Current Baseline Estimate
5. Total Estimated Cost (TEC) --	$ 11,005		
6. Total Project Cost (TPC) --	$ 11,128		

7. Financial Schedule (Federal Funds):

Fiscal Year	Appropriations	Adjustments	Obligations	Costs
1999	$ 2,000	$ 0	$ 2,000	$ 1,021
2000	9,005	0	9,005	8,002
2001	0	0	0	1,982

1. Title and Location of Project:	Renovate Existing Roadways Nevada Test Site, Nevada (continued)	2a. Project No.: 99-D-108 2b. Construction Funded

8. Project Description, Justification and Scope

This project will provide for the renovation of 37.0 miles of Mercury Highway from the southern boundary of the Nevada Test Site (NTS) to the intersection of Rainier Mesa Road to Area 3. These repairs will consist of removing existing debris from pavement cracks, filling cracks with asphalt sealant, installing a stress absorbing membrane, and applying a new asphaltic-concrete overlay. In addition, the 2.3 miles of the Rainier Mesa Road from the intersection of Mercury Highway to the intersection of road 4-04 in Area 4 will be reconstructed. Repairs will consist of total reconstruction of the roadbed and the application of the asphalt pavement.

The renovated road will have two-inch-thick overlay; the reconstructed road will have three-inch-thick paving. Aggregate shoulders will parallel each side. All required traffic signs, striping, and markers will be included in this project. No buildings or utilities are included in this project.

Mercury Highway is the primary access highway for any activity at the NTS, including subcritical experiments and future missions. This all-weather, paved, asphaltic-concrete road has been in service for almost 40 years. All personnel, heavy equipment, and supplies entering and/or exiting the NTS depend upon this access route. The pavement surface has severely deteriorated because of age, ground motion from underground nuclear events, and heavy truck traffic. Trucks frequently carry loads that far exceed normal highway limits, i.e., H-20 highway wheel-loading. Standard remedial measures, such as crack-filling or chip-and-seal overlays, will do little to extend the road's service life. The proposed extensive renovation will both eliminate the pavement distress as well extend the road's service life.

The Rainier Mesa Road is the only access road to the ongoing Big Explosive Experiment Facility (BEEF) in Area 4. This road is now extensively damaged. Total reconstruction of this road is required to continue use as a viable access road in support of the BEEF program.

The requested funding is expected to accomplish the following by fiscal year:

FY 1999: Conduct soils and geologic investigations; perform land surveying and complete engineering and design efforts.

FY 2000: Renovate Mercury Highway and reconstruct Rainier Mesa Road.

1. Title and Location of Project:	Renovate Existing Roadways Nevada Test Site, Nevada (continued)	2a. Project No.: 99-D-108 2b. Construction Funded

9. Details of Cost Estimate

		Item Cost	Total Cost
a.	Design and Management Costs		$ 1,606
	(1) Engineering design and inspection at approximately 14.7 percent of construction costs (Item c)	$ 1,147	
	(2) Construction management costs (included in construction costs)	0	
	(3) Project management at 5.9 percent of construction costs (Item c)	459	
b.	Land and land rights		0
c.	Construction costs		7,800
	1. Improvements to land	7,800	
	2. Buildings	0	
	3. Other structures	0	
	4. Utilities	0	
	5. Demolition	0	
d.	Standard equipment		0
e.	Major computer items		0
f.	Removal cost less salvage		0
g.	Design and project liaison, testing, checkout and acceptance		0
h.	Subtotal (a through g)		$ 9,406
i.	Contingencies at approximately 17 percent of above costs		1,599
j.	Total line item cost (Section 11.a.1.(a))		$ 11,005
k.	LESS: Non-Federal contribution		0
l.	Net Federal total estimated cost (TEC)		$ 11,005

Current estimate based on the updated Condition Assessment Survey dated June 1994.

10. Method of Performance

Design will be performed by the performance based management contractor. To the extent feasible, construction and procurement will be accomplished by fixed-price contracts and subcontracts awarded on the basis of competitive bidding. Inspection, contract administration, surveying, and related project functions will be accomplished by the performance based management contractor.

11. Schedule of Project Funding and Other Related Funding Requirements

	Prior Years	FY 1997	FY 1998	FY 1999	FY 2000	Outyears	Total
a. Total project costs							
1. Total facility costs							
(a) Line item (Section 9.j.)	$ 0	$ 0	$ 0	$ 1,021	$ 8,002	$ 1,982	$ 11,005
(b) Plant, Engineering and Design (PE&D)	0	0	0	0	0	0	0
(c) Operating expense funded equipment	0	0	0	0	0	0	0
(d) Inventories	0	0	0	0	0	0	0
(e) Total facility costs (Federal and Non-Federal)	$ 0	$ 0	$ 0	$ 1,021	$ 8,002	$ 1,982	$ 11,005
2. Other project costs							
(a) R&D necessary to complete project	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
(b) Conceptual design cost	92	0	0	0	0	0	92
(c) Decontamination and Decommissioning (D&D)	0	0	0	0	0	0	0
(d) NEPA documentation costs	26	0	0	0	0	0	26
(e) Other project related costs	5	0	0	0	0	0	5
(f) Total other project costs	$ 123	$ 0	$ 0	$ 0	$ 0	$ 0	$ 123
(g) Total project costs	123	$ 0	$ 0	$ 1,021	$ 8,002	$ 1,982	$ 11,128
(h) LESS: Non-Federal contribution	0	0	0	0	0	0	0
(i) Net Federal total project costs (TPC)	$ 123	$ 0	$ 0	$ 1,021	$ 8,002	$ 1,982	$ 11,128

11. Schedule of Project Funding and Other Related Funding Requirements (Continued)

b. Related annual costs (estimated life of project--35 years)

1. Facility operating costs	$ 0
2. Facility maintenance and repair costs	0
3. Programmatic operating expenses directly related to the facility	0
4. Capital equipment not related to construction but related to the programmatic effort in the facility	0
5. GPP or other construction related to the programmatic effort in the facility	0
6. Utility costs	0
7. Other costs	0
Total related annual costs	$ 0

12. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

a. Total project costs
   1. Total facility costs
      (a) Line item -- Construction line item costs will provide sufficient funds to construct this road.
      (b) PE&D -- None.
      (c) Operating expense funded equipment -- None.
      (d) Inventories -- None.
   2. Other project costs
      (a) R&D necessary to complete construction -- None.
      (b) Conceptual design -- Approximately $92,000 was incurred to develop the scope of the project.
      (c) Decontamination and Decommissioning (D&D) -- None.
      (d) NEPA documentation -- Approximately $26,000 was incurred to develop NEPA documentation.
      (e) Other project related funding -- Approximately $5,000 was expended on miscellaneous reporting requirements.

12. Narrative Explanation of Total Project Funding and Other Related Funding Requirements (Continued)

b. Related annual costs
   1. Facility operating costs -- None.
   2. Facility maintenance and repair costs -- None
   3. Programmatic operating expenses directly related to the facility -- None.
   4. Capital equipment not related to construction but related to the programmatic effort of the facility -- None.
   5. GPP or other construction related to the programmatic effort -- None.
   6. Utility costs -- None.
   7. Other Costs -- None.

DEPARTMENT OF ENERGY
FY 1999 CONGRESSIONAL BUDGET REQUEST

WEAPONS ACTIVITIES
(Tabular dollars in thousands. Narrative material in whole dollars.)

Weapons Stockpile Stewardship

1. Title and Location of Project: Joint Computational Engineering Laboratory
Sandia National Laboratories, Albuquerque, New Mexico

2a. Project No.: 99-D-107
2b. Constructed Funded

		Preliminary Schedule	Title I Baseline	Current Baseline Schedule
3a.	Date A-E Work Initiated (Title I Design Start Scheduled):	2nd Qtr. FY 1999		
3b.	A-E Work (Titles I & II) Duration:	13 months		
4a.	Date Physical Construction Starts:	3rd Qtr. FY 2000		
4b.	Date Construction Ends:	4th Qtr. FY 2001		
		Preliminary Estimate	Title I Baseline	Current Baseline Estimate
5.	Total Estimated Cost (TEC) --	$ 28,869		
6.	Total Project Cost (TPC) --	$ 30,478		

7. Financial Schedule (Federal Funds):

Fiscal Year	Appropriations	Adjustments	Obligations	Costs
1999	1,800	0	1,800	1,538
2000	10,700	0	10,700	5,758
2001	16,369	0	16,369	20,317
2002	0	0	0	1,256

8. Project Description, Justification and Scope

The Joint Computational Engineering Laboratory (JCEL) will be a new, state-of-the-art facility at Sandia National Laboratories for research, development, and application of leading-edge, high-end computational and communications technologies. JCEL will provide office space and laboratories for 175 people in a building with a total of 55,202 gross square feet. JCEL will be the center of Sandia's computational modeling, analysis, and design community, and will be constructed in close proximity to Sandia's existing computer and communications building, presently occupied by part of this community.

JCEL's primary mission is to ensure the rapid development and application of high-end computing, modeling, analysis, and design needed to achieve the objectives of DOE's Science-Based Stockpile Stewardship and Management program.

JCEL will attract key experts to create strategic simulations and advanced collaborative environments, and it will provide space for strategic partners from universities, DOE Laboratories, and the private sector to work together to integrate the technological expertise of government, universities, and industry. Increased interaction, collaboration, and teamwork are essential for shifting more rapidly to science-based methods and for effective stewardship of the nuclear stockpile. JCEL will provide classified and unclassified space in close proximity to facilitate collaboration between the users of high-end simulation technology and the developers, including R&D partners from universities and industry, while maintaining strict security of classified weapon information. JCEL will also include space designed to encourage interaction and collaboration among the scientists and engineers occupying the building and will provide work space tailored for multidisciplinary, high-performance teams who will develop computer codes and analyze nuclear weapons.

JCEL will provide labs for developing, prototyping and using Virtual Environment Technology, where designers, analysts, and experimenters can interact with each other as if they were in the same room. Moreover, JCEL will use, as well as develop, this leading-edge technology. It will prototype and demonstrate a science and engineering workplace of the 21st century.

The communications networks will enable JCEL’s occupants to use the supercomputers in the DOE complex. To display the extensive results of complicated, three-dimensional simulations of nuclear weapons, the JCEL project will also provide computer equipment for virtual reality and advanced visualization techniques, graphics workstations and printers, and video equipment.

8. Project Description, Justification and Scope: (Continued)

To achieve its goals, the JCEL project will provide:

- A new facility of approximately 55,202 gross square feet located immediately south of Building 880 in Technical Area I of Sandia National Laboratories on Kirtland Air Force Base in Albuquerque, New Mexico.
- Office space, laboratory space, management and administrative space, and interaction and meeting space.
- Access zones that include controlled, limited-access, and restricted areas.
- Red (classified) and black (unclassified) communications within the new facility and between the facility and the rest of Sandia and DOE complex.
- Computer equipment for displaying and printing the results from complex, three-dimensional computer simulations of nuclear weapons.
- Computer workstations for use by engineers and scientists from other DOE labs, universities, and the private sector assigned temporarily to JCEL.
- Video equipment for video conferencing, displaying, and editing video images produced by computer simulations.

Benefits

- Reduced program costs through use of high-fidelity computer simulations developed through JCEL programs to reduce the scope of costly test programs.
- Faster response on stockpile stewardship issues that will arise.
- Rapid interchange of appropriate technology with the external community.
- Accelerated Defense Program technology development.
- Cost savings in the development of Sandia research foundation technology base through in-kind contributions from industrial partners.

1. Title and Location of Project:	Joint Computational Engineering Laboratory Sandia National Laboratories, Albuquerque, New Mexico (continued)	2a. Project No.: 99-D-107 2b. Construction Funded

8. Project Description, Justification and Scope: (Continued)

Project Scope

Plan, design, and construct a new, three-story building to accommodate a total of about 175 people, which will provide classified and unclassified space in close proximity. The project will provide computer equipment to: display three-dimensional simulations; support engineers and scientists from other DOE labs, universities, and the private sector, and provide video conferencing capability. Computer equipment includes: Interactive Multimedia equipment ($3,488,460); Virtual Reality/Advanced Visualization equipment ($1,162,820); high-end 3D graphic workstations and printers ($418,625); and design and analysis workstations ($465,128). In addition, the project will move existing furniture and install some new furniture. Site landscaping, parking, pedestrian access improvements, signage, and fencing improvements will be provided.

The FY 1999 funds will be used for Title I and Title II design and project management.

1. Title and Location of Project:	Joint Computational Engineering Laboratory Sandia National Laboratories, Albuquerque, New Mexico (continued)	2a. Project No.: 99-D-107 2b. Construction Funded

9. Details of Cost Estimate

		Item Cost	Total Cost
a.	Design and Management Costs		$ 3,518
	(1) Engineering design and inspection at approximately 18 percent of construction costs (Item c)	$ 2,437	
	(2) Construction management costs at approximately 3.3 percent of construction costs (Item c).	451	
	(3) Project management at 4.7 percent of construction costs (Item c)	630	
b.	Land and land rights		0
c.	Construction costs		13,506
	1. Improvements to land	1,029	
	2. Buildings	11,776	
	3. Other structures	0	
	4. Utilities	701	
	5. Special facilities.	0	
d.	Standard equipment		2,371
e.	Major computer items		5,535
f.	Removal cost less salvage		0
g.	Design and project liaison, testing, checkout and acceptance		0
h.	Subtotal (a through g)		$ 24,930
i.	Contingencies at approximately 15.8 percent of above costs		3,939
j.	Total line item cost (Section 11.a.1.(a))		$ 28,869
k.	LESS: Non-Federal contribution		0
l.	Net Federal total estimated cost (TEC)		$ 28,869

Costs based on Conceptual Design Report dated June 1997.

1. Title and Location of Project:	Joint Computational Engineering Laboratory Sandia National Laboratories, Albuquerque, New Mexico (continued)	2a. Project No.: 99-D-107 2b. Construction Funded

10. Method of Performance

Architectural and engineering design and inspection will be performed by Sandia Facilities Departments and/or under a competitive-bid fixed-price contract based on capability and capacity to perform the work. Construction will be performed under a competitive-bid fixed-price contract or multiple competitive-bid fixed-price contracts.

11. Schedule of Project Funding and Other Related Funding Requirements

	Prior Years	FY 1997	FY 1998	FY 1999	FY 2000	Outyears	Total
a. Total project costs							
1. Total facility costs							
(a) Line item (Section 9.j.)	$ 0	$ 0	$ 0	$ 1,538	$ 5,758	$ 21,573	$ 28,869
(b) Plant, Engineering and Design (PE&D)	0	0	0	0	0	0	0
(c) Operating expense funded equipment	0	0	0	0	0	0	0
(d) Inventories	0	0	0	0	0	0	0
(e) Total facility costs (Federal and Non-Federal)	$ 0	$ 0	$ 0	$ 1,538	$ 5,758	$ 21,573	$ 28,869
2. Other project costs							
(a) R&D necessary to complete project	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
(b) Conceptual design cost	596	346	0	0	0	0	942
(c) Decontamination and Decommissioning (D&D)	0	0	0	0	0	0	0
(d) NEPA documentation costs	0	0	0	0	0	0	0
(e) Other project related costs	0	44	244	293	34	52	667
(f) Total other project costs	$ 596	$ 390	$ 244	$ 293	$ 34	$ 52	$ 1,609
(g) Total project costs	596	$ 390	$ 244	$ 1,831	$ 5,792	$ 21,625	$ 30,478
(h) LESS: Non-Federal contribution	0	0	0	0	0	0	0
(i) Net Federal total project costs (TPC)	$ 596	$ 390	$ 244	$ 1,831	$ 5,792	$ 21,625	$ 30,478

11. Schedule of Project Funding and Other Related Funding Requirements (Continued)

b. Related annual costs (estimated life of project--30 years)

1. Facility operating costs	$ 259
2. Facility maintenance and repair costs	118
3. Programmatic operating expenses directly related to the facility	50,000
4. Capital equipment not related to construction but related to the programmatic effort in the facility	1,000
5. GPP or other construction related to the programmatic effort in the facility	0
6. Utility costs	175
7. Other costs	0
Total related annual costs	$51,552

12. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

a. Total project costs

1. Total facility costs
   (a) Line item -- Narrative not required.
   (b) PE&D -- None.
   (c) Operating expense funded equipment -- None.
   (d) Inventories -- None.
2. Other project costs
   (a) R&D necessary to complete construction -- None.
   (b) Conceptual design -- CDR prepared June 1997.
   (c) Decontamination and Decommissioning (D&D) -- None.
   (d) NEPA documentation -- Environmental Checklist/Action Description Memorandum (ECL/ADM) submitted. An Environmental Assessment is not required.
   (e) Other project related costs -- Project Execution Plan, Pre-Title I Development, Design Criteria, Safeguards and Security Analysis, A/E Selection, Value Engineering Study, Independent Cost Estimate, Energy Conservation Report, Fire Hazards Assessment, Site Surveys, Soils Reports, Permits, Administrative Support, Operations & Maintenance Support, ES&H Monitoring, Operations Testing, Security Escorts Energy Management Control System Support, Readiness Assessment.

12. Narrative Explanation of Total Project Funding and Other Related Funding Requirements (Continued)

b. Related annual costs

1. Facility operating costs -- When the facility is operating in the 1st Quarter of FY 2002, average $259,000 for labor and materials per year. An average of 3.4 staff years will be required to operate the facility.
2. Facility maintenance and repair costs -- $118,000. This includes materials and a total of 1.0 staff years per year to maintain the facility.
3. Programmatic operating expenses directly related to the facility -- Estimated at $50,000,000 based on representative current operating expense of the 175 people that will be consolidated in JCEL upon completion. The majority of this funding is expected to come from DOE/DP for activities in support of the Nuclear Weapons Stockpile Stewardship Program. Lesser amounts are expected from other sources for activities which are mutually beneficial to the funding source and DOE/DP. By bringing these activities together in one building, we expect the effectiveness of this work to be increased by at least 10 percent and probably much more. This would correspond to a savings of at least $5 million per year of DOE/DP operating funds.
4. Capital equipment not related to construction but related to the programmatic effort of the facility -- $1,000,000 for pool and major items, based on representative current expenditures for 175 people in the new building.
5. GPP or other construction related to the programmatic effort -- None
6. Utility costs -- Average $175,000.
7. Other Costs -- $0.

DEPARTMENT OF ENERGY
FY 1999 CONGRESSIONAL BUDGET REQUEST

WEAPONS ACTIVITIES
(Tabular dollars in thousands. Narrative material in whole dollars.)

Weapons Stockpile Stewardship

1. Title and Location of Project: Model Validation and Systems Certification Test Center
Sandia National Laboratories, Albuquerque, New Mexico

2a. Project No.: 99-D-106
2b. Constructed Funded

	Preliminary Schedule	Title I Baseline	Current Baseline Schedule
3a. Date A-E Work Initiated (Title I Design Start Scheduled):	2nd Qtr. FY 1999		
3b. A-E Work (Titles I & II) Duration:	12 months		
4a. Date Physical Construction Starts:	3rd Qtr. FY 2000		
4b. Date Construction Ends:	4th Qtr. FY 2001		

	Preliminary Estimate	Title I Baseline	Current Baseline Estimate
5. Total Estimated Cost (TEC) --	$ 18,219		
6. Total Project Cost (TPC) --	$ 19,111		

7. Financial Schedule (Federal Funds):

Fiscal Year	Appropriations	Adjustments	Obligations	Costs
1999	$ 1,600	$ 0	$ 1,600	$ 1,047
2000	9,200	0	9,200	6,616
2001	7,419	0	7,419	10,149
2002	0	0	0	407

8. Project Description, Justification and Scope

The Department of Energy (DOE) has the statutory and mission responsibility for the design, production, maintenance, retirement and dismantlement of the United States nuclear weapons. In support of this mission, Defense Programs is responsible for the engineering development of the nonnuclear components and the overall systems engineering and integration for all nuclear weapons, including the integration of nuclear weapons with their delivery vehicles. Responsibilities also include assuring that weapons' military characteristics (MCs) and Stockpile-to-Target-Sequence (STS) requirements are met for hostile, normal, and abnormal environments.

Pertinent, reliable, and timely information is key to fulfilling these responsibilities, and in part, this information is obtained through laboratory testing and corresponding analysis. Testing is performed in five primary areas in support of nonnuclear components and systems:

1. Development testing (testing to certify design intent)
2. Experimentation to validate and certify analytical models
3. Product certification (such as neutron generators and AT 400 containers)
4. Surveillance testing, which sometimes includes investigative testing
5. Testing to support dismantlement.

Confidence in certifying the stockpile has been and will continue to be contingent upon high-quality, reliable, and pertinent data and competent analysis of that data, although the approach to obtain and analyze data and the nature of the data will change in response to DOE stockpile stewardship challenges.

The Model Validation and Systems Certification Center (MVSCTC) Project will provide a modern communications infrastructure coupled with a common control/operations facility for Sandia's eleven full-scale environmental test capabilities located in Tech Area III. The concept design of the MVSCTC reflects an optimized operational system composed of three subsystems including: Communications Infrastructure, Command and Control, and facilities to accommodate related operational functions.

The MVSCTC Project will implement an operational system that allows for both remote and local control of each of the test capabilities. This system will allow for more effective and efficient management of test operations and provide flexibility in meeting programmatic and specific customer needs. The Command and Control Center (CCC) will provide the remote control; Mobile Interface Units (MIUs) will provide local data acquisition and command and control as well as connection to the communications infrastructure at the individual test capabilities.

8. Project Description, Justification and Scope (Continued)

The MVSCTC communications infrastructure will be comprised of a communications hub (the CCC) and supporting infrastructure (communications media from the CCC to each of the test sites) that will link Sandia's environmental test capabilities to other Sandia personnel involved in modeling, simulation, design and related activities. Additionally, the infrastructure will link the MVSCTC into the nuclear weapons complex (NWC) electronic information network. The communications infrastructure will consist of high-capacity cabling installed in an underground concrete-encased ductbank of conduits. The capacity and robust nature of this infrastructure protection assures not only the viability of the communications infrastructure over the long run but also allows advances in communications technology to be easily incorporated over the life of the system.

Two MIUs, which are self-contained mobile trailers that house the equipment necessary to control the test capabilities and collect data from them, will be used for local control of test capability and to interface the communications system to nine of the eleven test capabilities. (Two test capabilities have unique programmatic needs that require connection to the communications system at all times.) Shared use of these two MIUs to support nine test facilities standardizes and reduces the equipment that is otherwise required at each of the test facilities. The MIUs are being built as part of Sandia's Modernization Program; only the purchase and installation of the pertinent communications infrastructure termination equipment to be placed in the MIU as part of the MVSCTC is included in this capital project request.

Facilities to Accommodate Related Operational Functions

The scope of the proposed project will include the rehabilitation of two existing buildings, Buildings 6584 and 6587. A small addition will be constructed on the southwest corner of Building 6584 to accommodate a new entry ramp and lobby for the Command and Control Center. Included in the scope is 15,200 square feet of Building 6584 (circa 1950) and 4,700 square feet in the west end of Building 6587 (circa 1950). Existing occupants will be relocated to accommodate the MVSCTC.

Special Facilities

Communications Infrastructure

The communications infrastructure is the overall system of fiber-optic and copper lines and related infrastructure elements. To provide needed communications capacities, an unspliced 72 fiber cable will be installed from the CCC to each test capability. Use of unspliced runs assures longevity of the infrastructure and maximum information transmission capacity.

8. Project Description, Justification and Scope (Continued)

In addition to the fiber-optic cable, copper lines consisting of 30 pairs of telephone cable and 15 pairs of individually-shielded instrumentation cable will be installed. The telephone cable provides 24-hour service to each test capability for telephone, fire, and intrusion systems.

All fiber-optic and copper lines will be installed in a PVC ductbank, placed in a trench and encased in concrete. The depth of the concrete encased ductbank will be 30-inches below grade. Associated manholes and/or junction boxes will be locked.

The proposed communications infrastructure is located primarily within Sandia's Tech Area III. However, the main fiber optic trunk, which is to be installed from the existing Tech Control Center (TCC) in the Technology Support Center (TSC, Building 6585) to the MVSCTC, extends beyond the Tech Area III borders. The TSC is located just outside Tech Areas III and V, approximately 400 linear feet from the MVSCTC common control facility in Building 6584. The Tech Control Center (TCC) in the TSC will provide the point of physical connection into existing telecommunications infrastructure.

Planned connection to the existing copper telephone infrastructure will occur at a location close to the TSC (specifically, Building 6585A containing an optical remote) or at an additional trunk breakout location near the Centrifuge Facility, Building 6526. The actual connection point will depend on modifications that Sandia is presently making to the telephone infrastructure.

Command/Control System

The command and control system includes all the electronic systems required to manage the communications systems, interface the information systems to the test capabilities and allow operators, engineers, and customers to control capability functions and observe and record operations. Electronic equipment required to perform these functions includes: digital network and video switching and transmission hardware; computer systems; video display and recording systems; and hardcopy peripherals. The majority of this equipment will be located in the CCC. Hardware required for the communications network completion at the test site or in the MIUs is also included in the MVSCTC Project scope.

Planned use of the FY 1999 funding is for Title I and Title II design and Project Management.

1.	Title and Location of Project:	Model Validation and Systems Certification Test Center Sandia National Laboratories, Albuquerque, New Mexico (continued)	2a. Project No.: 99-D-106 2b. Construction Funded

9. Details of Cost Estimate

		Item Cost	Total Cost
a.	Design and Management Costs		$ 2,255
	(1) Engineering design and inspection at approximately 10.9 percent of construction costs (Item c) .(Design, Drawings, and Specifications: $691,169)	$ 1,277	
	(2) Construction management costs at approximately 3.6 percent of construction costs (Item c).	423	
	(3) Project management at 4.7 percent of construction costs (Item c)	555	
b.	Land and land rights		0
c.	Construction costs		11,720
	1. Improvements to land	227	
	2. Buildings	2,907	
	3. Other structures	0	
	4. Utilities	0	
	5. Special facilities	8,586	
d.	Standard equipment		1,473
e.	Major computer items		0
f.	Removal cost less salvage		0
g.	Design and project liaison, testing, checkout and acceptance		0
h.	Subtotal (a through g)		$ 15,448
i.	Contingencies at approximately 17.9 percent of above costs		2,771
j.	Total line item cost (Section 11.a.1.(a))		$ 18,219
k.	LESS: Non-Federal contribution		0
l.	Net Federal total estimated cost (TEC)		$ 18,219

Current estimate based on Conceptual Design Report of March 12, 1997.

10. Method of Performance

Architectural and engineering design and inspection will be performed by Sandia Facilities Departments and/or under a negotiated fixed-price contract based on qualifications. Construction and procurement will be performed under a competitive-bid fixed-price contract or multiple competitive-bid fixed-price contracts.

11. Schedule of Project Funding and Other Related Funding Requirements

	Prior Years	FY 1997	FY 1998	FY 1999	FY 2000	Outyears	Total
a. Total project costs							
1. Total facility costs							
(a) Line item (Section 9.j.)	$ 0	$ 0	$ 0	$ 1,047	$ 6,616	$ 10,556	$ 18,219
(b) Plant, Engineering and Design (PE&D)	0	0	0	0	0	0	0
(c) Operating expense funded equipment	0	0	0	0	0	0	0
(d) Inventories	0	0	0	0	0	0	0
(e) Total facility costs (Federal and Non-Federal)	$ 0	$ 0	$ 0	$ 1,047	$ 6,616	$ 10,556	$ 18,219
2. Other project costs							
(a) R&D necessary to complete project	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
(b) Conceptual design cost	162	150	0	0	0	0	312
(c) Decontamination and Decommissioning (D&D)	0	0	0	0	0	0	0
(d) NEPA documentation costs	10	10	0	0	0	0	20
(e) Other project related costs	0	36	160	88	100	176	560
(f) Total other project costs	$ 172	$ 196	$ 160	$ 88	$ 100	$ 176	$ 892
(g) Total project costs	172	$ 196	$ 160	$ 1,135	$ 6,716	$ 10,732	$ 19,111
(h) LESS: Non-Federal contribution	0	0	0	0	0	0	0
(i) Net Federal total project costs (TPC)	$ 172	$ 196	$ 160	$ 1,135	$ 6,716	$ 10,732	$ 19,111

1. Title and Location of Project:	Model Validation and Systems Certification Test Center Sandia National Laboratories, Albuquerque, New Mexico (continued)	2a. Project No.: 99-D-106 2b. Construction Funded

11. Schedule of Project Funding and Other Related Funding Requirements

b. Related annual costs (estimated useful life of each facility: 20 to 40 years)

1. Facility operating costs	$ 141
2. Facility maintenance and repair costs	818
3. Programmatic operating expenses directly related to the facility	5,733
4. Capital equipment not related to construction but related to the programmatic effort in the facility	235
5. GPP or other construction related to the programmatic effort in the facility	0
6. Utility costs	77
7. Other costs	0
Total related annual costs	$ 7,004

12. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

a. Total project funding

1. Total facility costs
   - (a) Line item -- Narrative not required.
   - (b) PE&D -- None.
   - (c) Operating expense funded equipment -- None.
   - (d) Inventories -- None.
   - (e) Non-Federal contribution -- None.
2. Other project costs
   - (a) R&D necessary to complete construction -- None.
   - (b) Conceptual Design Report prepared March 1997.
   - (c) Decontamination and Decommissioning (D&D) -- None.
   - (d) NEPA Documentation -- The project is included in the current draft (January 23, 1997) of the "Environmental Assessment (EA) of the Sandia National Laboratories Design, Evaluation, and Test Technologies Center at Technical Area III, Kirtland Air Force Base, Albuquerque, New Mexico." Based on the conclusions in the EA, it is anticipated that a Finding of No Significant Impact (FONSI) will be issued.
   - (e) Other project-related costs are project execution plan, pre-Title I project management, design criteria, A-E selection, value engineering, independent cost analysis, field surveys, ES&H support, construction administration support, escorts, construction permits, reporting, and project close-out.
   - (f) Non-Federal contribution -- None.

12. Narrative Explanation of Total Project Funding and Other Related Funding Requirements (Continued)

b. Related annual costs

1. Facility operating costs, when all facilities are operational, the 4th Quarter FY 2001, average $127,000 for labor and $14,000 for materials per year. An average of 1.7 staff years will be required annually to operate all facilities. The facility does not replace any other facility.
2. Facility maintenance and repair costs for all facilities average $348,000 for labor and $470,000 for materials. A total of 5 staff years is required annually to maintain all facilities.
3. Programmatic operating expenses directly related to all facilities: Estimate reflects annual programmatic operating expenses associated with the operations and maintenance of the eleven test capabilities that are to be connected through the communications infrastructure to the common command and control facility implemented by the MVSCTC. Estimate includes: all loaded labor associated with direct test activities as well as preventative maintenance; facility costs (space charges, direct purchases, service contracts, etc.) and associated overhead loads. Estimate also includes projected, annualized operating expenditures incurred to maintain, repair, or replace-in-kind the existing equipment in these test capabilities. (Capital expenses are included in #4 below.)
4. Capital equipment cost not related to construction but related to the programmatic effort in all facilities: Estimate includes capital equipment items to support operations of the 11 test capabilities associated with the MVSCTC project. Equipment includes laser tracker image tubes, vibration shakers, a mass spectrometer, laser system, data storage system, and mobile interface units.
5. GPP or other construction related to the programmatic effort -- None.
6. Utility costs for all facilities will average $77,000 per year.
7. Other costs will average $0 per year.

DEPARTMENT OF ENERGY
FY 1999 CONGRESSIONAL BUDGET REQUEST

WEAPONS ACTIVITIES
(Tabular dollars in thousands. Narrative material in whole dollars.)

Weapons Stockpile Stewardship

1. Title and Location of Project: Central Health Physics Calibration Facility, TA-36
Los Alamos National Laboratory, Los Alamos, New Mexico

2a. Project No.: 99-D-105
2b. Constructed Funded

	Preliminary Schedule	Title I Baseline	Current Baseline Schedule
3a. Date A-E Work Initiated (Title I Design Start Scheduled):	1st Qtr. FY 1999		
3b. A-E Work (Titles I & II) Duration:	9 months		
4a. Date Physical Construction Starts:	1st Qtr. FY 2000		
4b. Date Construction Ends:	1st Qtr. FY 2000		

	Preliminary Estimate	Title I Baseline	Current Baseline Estimate
5. Total Estimated Cost (TEC) --	$ 3,900		
6. Total Project Cost (TPC) --	$ 4,200		

7. Financial Schedule (Federal Funds):

Fiscal Year	Appropriations	Adjustments	Obligations	Costs
1999	$ 3,900	$ 0	$ 3,900	$ 1,950
2000	0	0	0	1,950

8. Project Description, Justification and Scope

The purpose of this project is to consolidate all of the existing health physics calibration functions at LANL in one location. The location will be remote from the general public due to the radiation present when calibrating instruments. The facility will allow calibration of radiation protection instruments to the required levels for: x-rays, beta, and alpha contamination, gamma-rays, tritium, and neutrons.

The equipment and sources currently used for the radiation detector calibrations are over 30 years old in almost all cases. Source drive mechanisms have exceeded their useful lives. If an equipment failure or a source rupture occurs (due to old age), the mission of the Laboratory could be severely compromised. Without appropriate health physics instruments in place, facilities could be shut down because of the possibility of compromised worker radiation protection.

The current facilities are scattered among three areas: the Calibration Building, TA-3-130; and the upper floor and two basement areas of the Physics Building, TA-3-40. A number of Physics Division personnel are located in the same building and close to the ESH-4 Calibration Laboratory at TA-3-40. Operations at the Calibration Laboratory can cause low level radiation exposures to these personnel. These exposures are not As-Low-As-Reasonably Achievable (ALARA). The operators of the existing calibration equipment are also subject to radiation fields due to the configuration of the radiation sources. These exposures would be eliminated with operations moved to a refurbished facility.

The LANL Radiation Instrument Calibration (RIC) function is a very important institutional program. Approximately 8,000 instruments are maintained, repaired, and calibrated each year. These include portable and fixed alpha/beta contamination monitors, exposure rate meters, tritium-in-air monitors, continuous air monitors, and stack effluent monitors. Effluent monitor results are reported to the Environmental Protection Agency (EPA). The calibrations performed have a significant link to radiation worker health and safety.

This newly renovated facility will allow the calibration functions to meet the requirements of 10 CFR 835, Occupational Radiation Protection; DOE Order 5480.4 -Environmental Protection, Safety and Health Protection, which requires compliance with ANSI N323 - Radiation Protection Instrument Test and Calibration, and ANSI N42.17 - Performance Specifications for Health Physics Instrumentation, and will enable the Laboratory to close a Tiger Team Category II finding.

The site selected, TA-36, Building 1 is currently occupied by a group performing administrative functions and very low level radiation experiments. The current occupants would be moved to another location. The TA-36 site is remote from the densely populated areas of the Laboratory, is served by paved roads, and is located in a secure area. The building (approximately 10,000 s.f.) will be renovated, additional shielding installed for the calibration function, and renovated for all functions associated with radiological calibration. One new smaller

8. Project Description, Justification and Scope: (Continued)

structure will be constructed at TA-36 by the project. The structure, Building 214, will be approximately 2,380 square feet and will house two free in air calibration functions that require high bay facilities. This building will be a concrete structure due to shielding requirements. The remote, refurbished site would eliminate the problems outlined above. The calibrations would be performed using state-of-the-art equipment, minimizing the probability of failure and the consequent threat to the Laboratory mission. The operator exposure would be eliminated as well. The ALARA concerns would no longer be an issue.

The FY 1999 appropriated funds will be used for design (Title I/II), procurement of special facilities equipment (SFE), Project Management, Construction Management, Title III, and Construction.

9. Details of Cost Estimate

		Item Cost	Total Cost
a.	Design and Management Costs		$ 370
	(1) Engineering design and inspection at approximately 9.7 percent of construction costs (Item c)	$ 250	
	(2) Construction management costs at 2.2 percent of construction costs (Item c)	58	
	(3) Project management at 2.4 percent of construction costs (Item c)	62	
b.	Land and land rights		0
c.	Construction costs		2,590
	1. Improvements to land	55	
	2. Buildings	1,310	
	3. Other structures	0	
	4. Utilities	0	
	5. Special facilities	1,225	
d.	Standard equipment		210
e.	Major computer items		0
f.	Removal cost less salvage		70
g.	Design and project liaison, testing, checkout and acceptance		0
h.	Subtotal (a through g)		$ 3,240
i.	Contingencies at approximately 20.4 percent of above costs		660
j.	Total line item cost (Section 11.a.1.(a))		$ 3,900
k.	LESS: Non-Federal contribution		0
l.	Net Federal total estimated cost (TEC)		$ 3,900

Current estimate based on completed Conceptual Design Report of June 27, 1997. Escalation is applied according to DOE approved escalation rates.

10. Method of Performance

Design and inspection will be performed under a negotiated architect-engineer fixed-price contract. Construction of the project will be accomplished by fixed-price contracts and subcontracts awarded on the basis of competitive bidding.

11. Schedule of Project Funding and Other Related Funding Requirements

	Prior Years	FY 1997	FY 1998	FY 1999	FY 2000	Outyears	Total
a. Total project costs							
1. Total facility costs							
(a) Line item (Section 9.j.)	$ 0	$ 0	$ 0	$ 1,950	$ 1,950	$ 0	$ 3,900
(b) Plant, Engineering and Design (PE&D)	0	0	0	0	0	0	0
(c) Operating expense funded equipment	0	0	0	0	0	0	0
(d) Inventories	0	0	0	0	0	0	0
(e) Total facility costs (Federal and Non-Federal)	$ 0	$ 0	$ 0	$ 1,950	$ 1,950	$ 0	$ 3,900
2. Other project costs							
(a) R&D necessary to complete project	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
(b) Conceptual design cost	50	50	30	0	0	0	130
(c) Decontamination and Decommissioning (D&D)	0	0	0	0	0	0	0
(d) NEPA documentation costs	20	0	40	0	0	0	60
(e) Other project related costs	0	30	30	30	20	0	110
(f) Total other project costs	$ 70	$ 80	$ 100	$ 30	$ 20	$ 0	$ 300
(g) Total project costs	70	$ 80	$ 100	$ 1,980	$ 1,970	$ 0	$ 4,200
(h) LESS: Non-Federal contribution	0	0	0	0	0	0	0
(i) Net Federal total project costs (TPC)	$ 70	$ 80	$ 100	$ 1,980	$ 1,970	$ 0	$ 4,200

11. Schedule of Project Funding and Other Related Funding Requirements (Continued)

b. Related annual costs (estimated life of project--30 years)

1. Facility operating costs	$ 30
2. Facility maintenance and repair costs	20
3. Programmatic operating expenses directly related to the facility	0
4. Capital equipment not related to construction but related to the programmatic effort in the facility	0
5. GPP or other construction related to the programmatic effort in the facility	0
6. Utility costs	12
7. Other costs	0
Total related annual costs	$ 62

12. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

a. Total project funding
   1. Total facility costs
      (a) Line item -- Narrative not required.
      (b) PE&D -- None.
      (c) Operating expense funded equipment -- None.
      (d) Inventories -- None.
   2. Other project costs
      (a) R&D necessary to complete construction -- None.
      (b) Conceptual design -- A detailed Engineering Study, Project Definition Study, and Conceptual Design have been completed.
      (c) Decontamination and Decommissioning (D&D) -- None.
      (d) NEPA Documentation -- includes studies for the DOE Environmental Checklist (DEC) and site surveys for Solid Waste Management Unit (SWMU) determination.
      (e) Other project related funding -- Project management costs prior to Critical Decision 2, development of safety documentation and startup costs.

12. Narrative Explanation of Total Project Funding and Other Related Funding Requirements (Continued)

b. Related annual costs

1. Facility operating costs -- Estimated at $30,000 per year.
2. Facility maintenance and repair costs -- Building TA-36-1 is an existing structure. Building 214 is a new building. The overall facility and repair costs are estimated at $20,000 per year.
3. Programmatic operating expenses directly related to the facility -- None.
4. Capital equipment not related to construction but related to the programmatic effort of the facility --None.
5. GPP or other construction related to the programmatic effort -- None.
6. Utility costs -- The estimated utility costs are $12,000 per year.
7. Other Costs -- None.

DEPARTMENT OF ENERGY
FY 1999 CONGRESSIONAL BUDGET REQUEST

WEAPONS ACTIVITIES
(Tabular dollars in thousands. Narrative material in whole dollars.)

Weapons Stockpile Stewardship

1.	Title and Location of Project:	Protection of Real Property (Roof Replacement-Phase II) Lawrence Livermore National Laboratory, Livermore, California		2a. Project No.: 99-D-104 2b. Constructed Funded
		Preliminary Schedule	Title I Baseline	Current Baseline Schedule
3a.	Date A-E Work Initiated (Title I Design Start Scheduled):	1st Qtr. FY 1999		
3b.	A-E Work (Titles I & II) Duration:	12 months		
4a.	Date Physical Construction Starts:	3rd Qtr. FY 1999 a/		
4b.	Date Construction Ends:	4th Qtr. FY 2001		
		Preliminary Estimate	Title I Baseline	Current Baseline Estimate
5.	Total Estimated Cost (TEC) —	$ 19,900		
6.	Total Project Cost (TPC) —	$ 19,930		

a/ Design and construction will be handled as three separate packages (Package 1 - 4 buildings; Package 2 - 3 buildings; Package 3 - 4 buildings). Construction on Package 1 will begin while design of Package 2 is still ongoing.

1. Title and Location of Project:	Protection of Real Property (Roof Replacement-Phase II) Lawrence Livermore National Laboratory, Livermore, California (continued)	2a. Project No.: 99-D-104 2b. Construction Funded

7. Financial Schedule (Federal Funds):

Fiscal Year	Appropriations	Adjustments	Obligations	Costs
1999	$ 7,300	$ 0	$ 7,300	$ 6,800
2000	6,400	0	6,400	6,600
2001	6,200	0	6,200	5,500
2002	0	0	0	1,000

8. Project Description, Justification and Scope

This project is the second of three phases of the LLNL roof replacement program. The first Phase is funded under 96-D-102. Phase II addresses 11 Weapons Stockpile Stewardship and Management Program buildings which require complete roofing system replacement along with the replacement of associated roof mounted equipment and piping systems which have deteriorated beyond economical repair. This is required in order to maintain and protect the integrity of the facilities and to assure that programmatic work can proceed without the risk of serious damage to the buildings or the programmatic efforts contained within. Work includes buildings: B111, B113, B121, B141, B194, B241, B231, B251, B281, B321 and B332. In all cases, the roofing systems have exceeded their 20 year design life by 11 to 23 years. The same holds true for most of the roof mounted equipment and piping systems as they are original equipment, again with an average design life of 20 years. Both the roofing and mechanical systems have deteriorated to the point where normal repair is no longer a viable alternative.

The 11 roofs in this project are experiencing severe deterioration problems including membrane failure, and the associated roof mounted mechanical equipment is also showing high levels of unreliable operation which adversely effect the support to the programmatic effort. As stated, normal maintenance procedures no longer are effective to maintain weather integrity of the roofing systems, to the point that leaks in the roofing system are jeopardizing experiments, experimental data and equipment. The impact from not replacing the roofing and mechanical equipment systems will result in excessive maintenance and repairs costs. In addition, the adverse programmatic impact could cost the Lab and Defense Programs significant dollars in lost production.

The reconstruction typically consists of: removal of the deteriorated roof membranes and insulation (some including asbestos); installation of new insulation and a four-ply built-up roof; and removal and replacement of roof-mounted mechanical equipment and piping systems, as necessary.

8. Project Description, Justification and Scope: (Continued)

The FY 1999 funds will be used for: Package 1 (Buildings B111, B113, B141 and B231) Title I and Title II design and support costs, value engineering, construction and activation; Package 2 (Buildings B322, B241 and B151) Title I and Title II, with physical construction not occurring on these buildings until FY 2000; and, project management by LLNL.

1. Title and Location of Project:	Protection of Real Property (Roof Replacement-Phase II) Lawrence Livermore National Laboratory, Livermore, California (continued)	2a. Project No.: 99-D-104 2b. Construction Funded

9. Details of Cost Estimate

		Item Cost	Total Cost
a.	Design and Management Costs		$ 3,705
	(1) Engineering design and inspection at approximately 9.9 percent of construction costs (Item c)	$ 1,330	
	(2) Construction management costs at approximately 11 percent of construction costs	1,480	
	(3) Project management at 6.7 percent of construction costs (Item c).	895	
b.	Land and land rights		0
c.	Construction costs		13,425
	1. Improvements to land	0	
	2. Building modifications	0	
	3. Other structures	6,535	
	4. Mechanical equipment	3,810	
	5. Utilities	0	
	6. Special facilities	1,140	
	7. Activation	615	
	8. Security	560	
	9. Procurement	765	
d.	Standard equipment		0
e.	Major computer items		0
f.	Removal cost less salvage		0
g.	Design and project liaison, testing, checkout and acceptance		0
h.	Subtotal (a through g)		$17,130
i.	Contingencies at approximately 16.2 percent of above costs		2,770
j.	Total line item cost (Section 11.a.1.(a))		$19,900
k.	LESS: Non-Federal contribution		0
l.	Net Federal total estimated cost (TEC)		$19,900

Current estimate based on conceptual design report of March 1997. Escalation is applied according to LLNL Cost Estimating Procedures and DOE approved escalation rate. This project has been estimated with full overhead.

10. Method of Performance

Contracting arrangements are planned as follows: The Laboratory proposes a new approach to the implementation of this project. The new approach includes obtaining the services of a roofing specialist to develop construction contractor specifications and perform construction management and inspection. The construction contract is planned to be a unit price based contract with standard construction details. Change order processing and negotiations will be greatly simplified. This new approach should greatly reduce the cost of engineering and design. As with any new approach, this method will require a higher level of LLNL management involvement to explain and gain acceptance of the approach. Minor architect-engineer work and activation will be performed by LLNL forces.

1. Title and Location of Project:	Protection of Real Property (Roof Replacement-Phase II) Lawrence Livermore National Laboratory, Livermore, California (continued)	2a. Project No.: 99-D-104 2b. Construction Funded

11. Schedule of Project Funding and Other Related Funding Requirements

	Prior Years	FY 1997	FY 1998	FY 1999	FY 2000	Outyears	Total
a. Total project costs							
1. Total facility costs							
(a) Line item (Section 9.j.)	$ 0	$ 0	$ 0	$ 6,800	$ 6,600	$ 6,500	$ 19,900
(b) Plant, Engineering and Design (PE&D)	0	0	0	0	0	0	0
(c) Operating expense funded equipment	0	0	0	0	0	0	0
(d) Inventories	0	0	0	0	0	0	0
(e) Total facility costs (Federal and Non-Federal)	$ 0	$ 0	$ 0	$ 6,800	$ 6,600	$ 6,500	$ 19,900
2. Other project costs							
(a) R&D necessary to complete project	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
(b) Conceptual design cost	0	25	0	0	0	0	25
(c) Decontamination and Decommissioning (D&D)	0	0	0	0	0	0	0
(d) NEPA documentation costs	0	0	0	0	0	0	0
(e) Other project related costs	0	5	0	0	0	0	5
(f) Total other project costs	$ 0	$ 30	$ 0	$ 0	$ 0	$ 0	$ 30
(g) Total project costs	0	$ 30	$ 0	$ 6,800	$ 6,600	$ 6,500	$ 19,930
(h) LESS: Non-Federal contribution	0	0	0	0	0	0	0
(i) Net Federal total project costs (TPC)	$ 0	$ 30	$ 0	$ 6,800	$ 6,600	$ 6,500	$ 19,930

11. Schedule of Project Funding and Other Related Funding Requirements (Continued)

b. Related annual costs (estimated life of project--20 to 40 years)

1. Facility operating costs	$ 0
2. Facility maintenance and repair costs	0
3. Programmatic operating expenses directly related to the facility	0
4. Capital equipment not related to construction but related to the programmatic effort in the facility	0
5. GPP or other construction related to programmatic effort in the facility	0
6. Utility costs	0
7. Other costs	0
Total related annual costs	$ 0

12. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

a. Total project funding

1. Total facility costs
   (a) Line item -- Narrative not required.
   (b) PE&D -- None.
   (c) Operating expense funded equipment -- None.
   (d) Inventories -- None.
2. Other project costs
   (a) R&D necessary to complete construction -- None.
   (b) Conceptual design -- Total funding in this classification represents the conceptual design cost and other studies determined to be necessary.
   (c) Decontamination and Decommissioning (D&D) -- None.
   (d) NEPA Documentation -- Categorical Exclusion from requirements for EA on file.
   (e) Other project related funding -- Project support costs of administration, startup and other related project support costs.
   (f) Non-federal contribution -- None.

12. Narrative Explanation of Total Project Funding and Other Related Funding Requirements (Continued)

b. Related annual costs

1. Facility operating costs -- None.
2. Facility maintenance and repair costs -- None.
3. Programmatic operating expenses directly related to the facility -- None.
4. Capital equipment not related to construction but related to the programmatic effort of the facility -- None.
5. GPP or other construction related to the programmatic effort -- None.
6. Utility costs -- None.
7. Other Costs -- None.

DEPARTMENT OF ENERGY
FY 1999 CONGRESSIONAL BUDGET REQUEST

WEAPONS ACTIVITIES
(Tabular dollars in thousands. Narrative material in whole dollars.)

Weapons Stockpile Stewardship

1. Title and Location of Project: Isotope Sciences Facilities
Lawrence Livermore National Laboratory, Livermore, California

2a. Project No.: 99-D-103
2b. Constructed Funded

		Preliminary Schedule	Title I Baseline	Current Baseline Schedule
3a.	Date A-E Work Initiated (Title I Design Start Scheduled):	1st Qtr. FY 1999		
3b.	A-E Work (Titles I & II) Duration:	9 months		
4a.	Date Physical Construction Starts:	2nd Qtr. FY 2000		
4b.	Date Construction Ends:	2nd Qtr. FY 2002		

		Preliminary Estimate	Title I Baseline	Current Baseline Estimate
5.	Total Estimated Cost (TEC) --	$ 19,400		
6.	Total Project Cost (TPC) --	$ 19,800		

7. Financial Schedule (Federal Funds):

Fiscal Year	Appropriations	Adjustments	Obligations	Costs
1999	$ 4,000	$ 0	$ 4,000	$ 2,000
2000	10,000	0	10,000	9,000
2001	5,400	0	5,400	5,000
2002	0	0	0	3,400

8. Project Description, Justification and Scope

This project provides for a major rehabilitation of the nuclear chemistry facilities at Lawrence Livermore National Laboratory to extend the life of these essential program facilities. The principle objective of the project is to enhance the radio chemistry research, analytical, and characterization services provided to Defense Programs activities at LLNL. These facilities also support critical analytical waste characterization and programmatic environmental monitoring activities as well.

This project provides for a seismic retrofit and construction of an office addition to the Isotope Science Facility (Building 151), retrofit of Building 151/Building 154 ventilation systems, decontamination of the Refractory Materials Facility (Building 241) and disposal of four existing trailers. The current nuclear chemistry building (B-151) is a 29-year old wet-chemistry research building in need of a major rehabilitation to extend its life in support of the Weapons Stockpile Stewardship and Management Program. The seismic rating of Building 151 does not meet current code requirements. This project will provide the seismic modifications necessary to meet current code requirements for performing isotopic research and support the ongoing mission.

- The Building 151 Office Addition is approximately 22,000 square feet contiguous to B-151. It resolves long standing co-location and program operating efficiency issues in a cost effective package. Exterior treatment will be selected consistent with the existing building, with access provided directly from Building 151 at both floor levels. The addition will contain offices, conference and meeting rooms, elevator, rest rooms, programmatic storage, and various support facilities.

- The existing Building 151 HVAC system is inefficient, difficult to maintain, and does not meet current requirements for exhaust and control. The majority of mechanical work entails taking approximately 51 fume-hood exhaust systems and manifolding them into four new systems. Two air handling units will be converted from constant-volume to variable-air-volume systems with variable-frequency drives. Building 154 is underutilized due to the difficulties in balancing the three air-pressure zones as required by researchers. To fully utilize this building for wet-chemistry laboratory use, the existing HVAC system, retention tank system, utilities, and fire-protection system must be upgraded. In addition, approximately 11 new fume hoods with associated exhaust ductwork, fans, and controls will be provided. B-151 and B-154 HVAC modifications and fume hood replacements will rehabilitate these high downtime and high maintenance subsystems and extend life to meet the current mission. Some safety and operational benefits also result.

- After moves are completed from Building 241, it will be characterized and decontaminated for future use by Defense Programs at LLNL. Four office trailers will be demolished or excessed to complete the moves. Consolidation of operations from B-241 and personnel from four older trailers complete the efficiency and cost-driven elements, which though minor in cost, have substantial operational benefits.

8. Project Description, Justification and Scope: (Continued)

Along with the seismic retrofit and HVAC system/fume hood replacement, the project encompasses program consolidation for increased efficiency of operations, indirect cost savings, and safety of operations benefits. These are reflected respectively in the B-151 Addition, the B-154 HVAC modifications, and program moves from B-241 and trailers (T-1326, T-1527, T-1927, and T-2425).

The FY 1999 funds will be used for Title I and Title II design and preparation of bid documents for construction.

1. Title and Location of Project:	Isotope Sciences Facilities Lawrence Livermore National Laboratory, Livermore, California (continued)	2a. Project No.: 99-D-103 2b. Construction Funded

9. Details of Cost Estimate

		Item Cost	Total Cost
a.	Design and Management Costs		$ 3,500
	(1) Engineering design and inspection at approximately 13.5 percent of construction costs	$ 1,650	
	(2) Construction management costs at approximately 6.4 percent of construction costs	780	
	(3) Project management at 8.7 percent of construction costs.	1,070	
b.	Land and land rights		0
c.	Construction costs		12,240
	1. Improvements to land	0	
	2. Buildings	10,720	
	3. Other structures	0	
	4. Utilities	0	
	5. Special facilities	0	
	6. Activation	930	
	7. Security	0	
	8. Procurement	590	
d.	Standard equipment		0
e.	Major computer items		0
f.	Removal cost less salvage		170
g.	Design and project liaison, testing, checkout and acceptance		0
h.	Subtotal (a through g)		$15,910
i.	Contingencies at approximately 21.9 percent of above costs		3,490
j.	Total line item cost (Section 11.a.1.(a))		$19,400
k.	LESS: Non-Federal contribution		0
l.	Net Federal total estimated cost (TEC)		$19,400

Current estimate based on conceptual design report of March 1997. Escalation is applied according to LLNL Cost Estimating Procedures and DOE approved escalation rate. This project has been estimated with full overhead.

10. Method of Performance

Contracting arrangements are as follows: Design will be performed by A-E and LLNL forces. Major equipment requiring long lead time will be purchased by LLNL early in the project on the basis of competitive bidding. To the extent feasible, construction will be accomplished by a fixed-price contract awarded on the basis of competitive bidding. Activation will be performed by LLNL forces.

11. Schedule of Project Funding and Other Related Funding Requirements

	Prior Years	FY 1997	FY 1998	FY 1999	FY 2000	Outyears	Total
a. Total project costs							
1. Total facility costs							
(a) Line item (Section 9.j.)	$ 0	$ 0	$ 0	$ 2,000	$ 9,000	$ 8,400	$ 19,400
(b) Plant, Engineering and Design (PE&D)	0	0	0	0	0	0	0
(c) Operating expense funded equipment	0	0	0	0	0	0	0
(d) Inventories	0	0	0	0	0	0	0
(e) Total facility costs (Federal and Non-Federal)	$ 0	$ 0	$ 0	$ 2,000	$ 9,000	$ 8,400	$ 19,400
2. Other project costs							
(a) R&D necessary to complete project	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
(b) Conceptual design cost	0	150	0	0	0	0	150
(c) Decontamination and Decommissioning (D&D)	0	0	0	0	0	0	0
(d) NEPA documentation costs	0	0	50	0	0	0	50
(e) Other project related costs	0	0	200	0	0	0	200
(f) Total other project costs	$ 0	$ 150	$ 250	$ 0	$ 0	$ 0	$ 400
(g) Total project costs	0	$ 150	$ 250	$ 2,000	$ 9,000	$ 8,400	$ 19,800
(h) LESS: Non-Federal contribution	0	0	0	0	0	0	0
(i) Net Federal total project costs (TPC)	$ 0	$ 150	$ 250	$ 2,000	$ 9,000	$ 8,400	$ 19,800

11. Schedule of Project Funding and Other Related Funding Requirements (Continued)

b. Related annual costs (estimated life of project--20 to 40 years)

1. Facility operating costs	$ 704
2. Facility maintenance and repair costs	0
3. Programmatic operating expenses directly related to the facility	N/A
4. Capital equipment not related to construction but related to the programmatic effort in the facility	0
5. GPP or other construction related to programmatic effort in the facility	0
6. Utility costs	0
7. Other costs	0
Total related annual costs	$ 704

12. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

a. Total project funding
   1. Total facility costs
      (a) Line item -- Narrative not required.
      (b) PE&D -- None.
      (c) Operating expense funded equipment -- Narrative not required.
      (d) Inventories -- None.
   2. Other project costs
      (a) R&D necessary to complete construction --None required.
      (b) Conceptual design -- Total funding in this classification represents conceptual design cost and other studies determined necessary.
      (c) Decontamination and Decommissioning (D&D) -- None.
      (d) NEPA documentation --Support cost for the NEPA process.
      (e) Other project related costs --Project support costs of administration, preliminary Safety Analysis Report, management program review, facility safety procedures, training, startup, and other related project support costs.

12. Narrative Explanation of Total Project Funding and Other Related Funding Requirements (Continued)

b. Related annual costs

1. Facility operating costs --Facility operating costs are $704,000 per year, once facility becomes operational in 3rd Qtr. FY 2001. Costs are based on the LLNL internal indirect rate Laboratory Facility Charge (FC) for facility operating costs including: maintenance, custodial, and utilities. An average of approximately 6 FTE staff years will be required to operate the facility per year.
2. Facility maintenance and repair costs --are included in 1. above
3. Programmatic operating expenses directly related to the facility --N/A
4. Capital equipment not related to construction, but related to the programmatic effort in the facility -- No narrative required.
5. GPP or other construction related to programmatic effort --Initially no GPP costs are anticipated, but to keep abreast of technology, presently undefined alterations will likely be required in the future.
6. Utility costs -- are in included in 1. above
7. Other costs -- None anticipated.

DEPARTMENT OF ENERGY
FY 1999 CONGRESSIONAL BUDGET REQUEST

WEAPONS ACTIVITIES
(Tabular dollars in thousands. Narrative material in whole dollars.)

Weapons Stockpile Stewardship

1. Title and Location of Project: Rehabilitation of the Maintenance Facility
Lawrence Livermore National Laboratory, Livermore, California

2a. Project No.: 99-D-102
2b. Constructed Funded

		Preliminary Schedule	Title I Baseline	Current Baseline Schedule
3a.	Date A-E Work Initiated (Title I Design Start Scheduled):	1st Qtr. FY 1999		
3b.	A-E Work (Titles I & II) Duration:	6 months		
4a.	Date Physical Construction Starts:	4th Qtr. FY 1999		
4b.	Date Construction Ends:	3rd Qtr. FY 2000		

		Preliminary Estimate	Title I Baseline	Current Baseline Estimate
5.	Total Estimated Cost (TEC) --	$ 7,900		
6.	Total Project Cost (TPC) --	$ 8,100		

7. Financial Schedule (Federal Funds):

Fiscal Year	Appropriations	Adjustments	Obligations	Costs
1999	$ 6,500	$ 0	$ 6,500	$ 4,220
2000	1,400	0	1,400	3,680

8. Project Description, Justification and Scope

Building 511 is the mission-critical center of all facility maintenance activity at the Lawrence Livermore National Laboratory (LLNL). In addition to being the center for general facilities maintenance, repair activities, and minor facilities modifications for all facilities at LLNL, the activities conducted in Building 511 include custom manufacture of items essential to experiments conducted in support of the Stockpile Stewardship and Management program and other programs at the lab.

Building 511 is a shop facility that is nearly 60 years old. It will be upgraded and remodeled to make it functional and serviceable for at least the next 20 years, while assuring life safety and operational requirements within the facility. New exterior finish system and window casements will provide a weather-tight building skin. Fire protection and electrical systems will be upgraded as required by code. Rest room facilities will be modified to reflect workplace diversity and to comply with accessibility standards. Entries to the facility will be upgraded for people and for material handling access and egress.

Specifically, this project will accomplish the following:

- Remove and dispose of asbestos siding (28,000 square feet) and install new exterior insulation finishing systems on all exterior faces of the building.
- Replace existing window units and glass (approximately 9,000 square feet).
- Upgrade all existing rest rooms.
- Update fire protection systems including fire exiting requirements, and replace existing fire sprinkler system.
- Replace code deficient and obsolete electrical panels, upgrade electrical receptacles, switches, and grounding.
- Modify building entry to accommodate easy passage of people and material.
- Install an elevator to facilitate movement of people and material to the second floor.

The FY 1999 funds will be used for Title I and Title II design and support costs, value engineering, construction, and project management by LLNL.

9. Details of Cost Estimate

		Item Cost	Total Cost
a.	Design and Management Costs		$ 2,600
	(1) Engineering design and inspection at approximately 26.2 percent of construction costs (Item c)	$ 1,030	
	(2) Construction management costs at approximately 17.7 percent of construction costs (Item c).	695	
	(3) Project management at approximately 22.3 percent of construction costs (Item c)	875	
b.	Land and land rights		0
c.	Construction costs		3,925
	1. Improvements to land	0	
	2. Building modification	3,500	
	3. Special equipment	0	
	4. Utilities	0	
	5. Special facilities	0	
	6. Activation.	165	
	7. Procurement	260	
d.	Standard equipment		0
e.	Major computer items		0
f.	Removal cost less salvage		0
g.	Design and project liaison, testing, checkout and acceptance		0
h.	Subtotal (a through g)		$ 6,525
i.	Contingencies at approximately 21.1 percent of above costs		1,375
j.	Total line item cost (Section 11.a.1.(a))		$ 7,900
k.	LESS: Non-Federal contribution		0
l.	Net Federal total estimated cost (TEC)		$ 7,900

Current estimate based on conceptual design report of March 1997. Escalation is applied according to LLNL Cost Estimating Procedures and DOE approved escalation rate. This project has been estimated with full overhead.

10. Method of Performance

Contracting arrangements are as follows: Design will be performed by LLNL Plant Engineering. Major equipment requiring long lead time will be purchased by LLNL early in the project on the basis of competitive bidding. To the extent feasible, construction will be accomplished by a fixed-price contract awarded on the basis of competitive bidding. Activation will be performed by LLNL forces.

11. Schedule of Project Funding and Other Related Funding Requirements

	Prior Years	FY 1997	FY 1998	FY 1999	FY 2000	Outyears	Total
a. Total project costs							
1. Total facility costs							
(a) Line item (Section 9.j.)	$ 0	$ 0	$ 0	$ 4,220	$ 3,680	$ 0	$ 7,900
(b) Plant, Engineering and Design (PE&D)	0	0	0	0	0	0	0
(c) Operating expense funded equipment	0	0	0	0	0	0	0
(d) Inventories	0	0	0	0	0	0	0
(e) Total facility costs (Federal and Non-Federal)	$ 0	$ 0	$ 0	$ 4,220	$ 3,680	$ 0	$ 7,900
2. Other project costs							
(a) R&D necessary to complete project	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
(b) Conceptual design cost	0	100	0	0	0	0	100
(c) Decontamination and Decommissioning (D&D)	0	0	0	0	0	0	0
(d) NEPA documentation costs	0	0	15	0	0	0	15
(e) Other project related costs	0	50	35	0	0	0	85
(f) Total other project costs	$ 0	$ 150	$ 50	$ 0	$ 0	$ 0	$ 200
(g) Total project costs	0	$ 150	$ 50	$ 4,220	$ 3,680	$ 0	$ 8,100
(h) LESS: Non-Federal contribution	0	0	0	0	0	0	0
(i) Net Federal total project costs (TPC)	$ 0	$ 150	$ 50	$ 4.220	$ 3,680	$ 0	$ 8 ,100

11. Schedule of Project Funding and Other Related Funding Requirements (Continued)

b. Related annual costs (estimated life of project--30 years)

1.	Facility operating costs	$ 557
2.	Facility maintenance and repair costs	0
3.	Programmatic operating expenses directly related to the facility	0
4.	Capital equipment not related to construction but related to the programmatic effort in the facility	0
5.	GPP or other construction related to programmatic effort in the facility	0
6.	Utility costs	0
7.	Other costs	0
	Total related annual costs	$ 557

12. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

a. Total project funding

1. Total facility costs
   - (a) Line item -- Narrative not required.
   - (b) PE&D -- None.
   - (c) Operating expense funded equipment -- None.
   - (d) Inventories -- None.
2. Other project costs
   - (a) R&D necessary to complete construction -- None.
   - (b) Conceptual design -- Total funding in this classification represents the conceptual design cost and other studies determined to be necessary.
   - (c) Decontamination and Decommissioning (D&D) -- None.
   - (d) NEPA Documentation -- Support cost for the NEPA process.
   - (e) Other project related funding -- Project support costs of administration, Preliminary Safety Analysis Report, Management Program Review, Facility Safety Procedures, training, startup, and other related project support costs.

12. Narrative Explanation of Total Project Funding and Other Related Funding Requirements (Continued)

b. Related annual costs

1. Facility operating costs -- $557,000 per year when facility is operational in 3rd Qtr. FY 2000. Costs are based on the LLNL internal indirect rate Laboratory Facility Charge (LFC) for facility operating costs including maintenance, custodial, and utilities. An average of approximately 6 FTE staff years will be required to operate the facility per year.
2. Facility maintenance and repair costs -- Included in (1.) above.
3. Programmatic operating expenses directly related to the facility -- None.
4. Capital equipment not related to construction but related to the programmatic effort of the facility -- Initially no GPP costs are anticipated but to keep abreast of technology, presently undefined alterations will likely be required in the future.
5. GPP or other construction related to the programmatic effort -- None.
6. Utility costs -- Included in (1.) above.
7. Other Costs -- None.

DEPARTMENT OF ENERGY
FY 1999 CONGRESSIONAL BUDGET REQUEST
(Changes from FY 1998 Congressional Budget Request are denoted with a vertical line in left margin.)

WEAPONS ACTIVITIES
(Tabular dollars in thousands. Narrative material in whole dollars.)

Weapons Stockpile Stewardship

1.	Title and Location of Project:	Dual-Axis Radiographic Hydrodynamic Test Facility (DARHT) Los Alamos National Laboratory, Los Alamos, New Mexico	2a. Project No.: 97-D-102 2b. Construction Funded

SIGNIFICANT CHANGES

- The FY 1998 Congressional Project Data Sheet included $81,000,000 as a planning estimate for Phase 2 and assumed that the technology used for the second axis accelerator would be the same as the first.

- Following completion of a Technology Options Study to select the best technology for the second axis accelerator, the Department has decided on the Long-Pulse Induction Accelerator generating four high-resolution radiographic pulses over two microseconds with a dynamic detector for the second axis. This data sheet reflects that decision. In the absence of underground testing, the Long-Pulse Linear Induction Accelerator represents a major and necessary increase in technical capability over the first axis machine. The four-pulse machine provides weapons laboratories with the capability to address several critical physics issues concerning aging nuclear weapons primaries in the stockpile that could not be addressed as effectively with the one-pulse technology. These include: providing time-resolved dynamic data covering the time from lowest pin level to maximum compression of the mock-up primary within a hydrodynamics test; benchmarking existing time-resolved two dimensional computer codes; developing the next-generation of three dimensional codes and machines; and, addressing crucial x-ray-based radiography issues for future x-ray-based hydrodynamics testing facilities. This information will assist in ensuring the continued safety and reliability of nuclear weapons in the enduring stockpile, and will further basic scientific understanding of the behavior of nuclear weapons.

- The revised TEC for Phase 2 is $154,000,000, an increase of $73,000,000 over the planning estimate. TPC is increased by $70,590,000 to $155,040,000. The new TEC and TPC for the project are $259,700,000 and $269,800,000, respectively.

1. Title and Location of Project:	Dual-Axis Radiographic Hydrodynamic Test Facility (DARHT) Los Alamos National Laboratory, Los Alamos, New Mexico	2a. Project No.: 97-D-102 2b. Construction Funded

SIGNIFICANT CHANGES (continued)

- There are several reasons for the increase in the TEC, as illustrated in the following chart (in thousands):

	EIS Estimate Used as Planning for FY 1998 CPDS	Current TEC Estimate Four-Pulse X-ray	Change
X-ray Source	$ 48,700	$108,200	$ 59,500
Vessel Preparation Facility	7,000	14,800	7,800
Containment Vessels	25,300	23,300	(2,000)
Subtotal	$ 81,000	$146,300	$ 65,300
Additional Instrumentation and Controls	0	7,700	7,700
Total	$ 81,000	$154,000	$ 73,000

  -- The major driver of the TEC increase is the change from a single-pulse x-ray system to a four-pulse x-ray system, which results in an increase of $59,500,000.

  -- The cost of the Vessel Preparation Facility increases by $7,800,000. The original estimate was for a facility of 9,260 sq. ft. The new baseline is for a facility of about 27,000 sq. ft. This is due to an increase in space requirements for confinement staging and a more mature design of containment vessels and the process for containment vessel clean-out.

1.	Title and Location of Project:	Dual-Axis Radiographic Hydrodynamic Test Facility (DARHT) Los Alamos National Laboratory, Los Alamos, New Mexico	2a. Project No.: 97-D-102 2b. Construction Funded

SIGNIFICANT CHANGES (continued)

-- The cost for the vessels decreases by $2,000,000. The original estimate was for five containment vessels, vessel cleanout, and handling. The new baseline includes one containment vessel and one confinement vessel, which is adequate to meet the Environmental Impact Statement (EIS) requirements for confinement when coupled with all other techniques used to minimize hydrotesting material releases.

-- Additional instrumentation and controls are required for the four-pulse accelerator. Additionally, some instrumentation costs were deferred from Phase 1 to Phase 2 and optical diagnostic capabilities were added to Phase 2 resulting in an increase of $7,700,000.

- Schedules have been revised to include Phase 2 scope. The start dates are the start dates for Phase 1; end dates are the end dates for Phase 2.

- The square footage of the Hydrotest Firing Site is increased by 1,450 square feet, or less than 4 percent: 150 sq. ft. of the increase is required to accommodate space for power supplies due to advanced technology for the first axis machine, but does not change the building footprint; 1,300 sq. ft. of the increase is required to accommodate the larger multipulse machine for the second axis machine, with a corresponding increase in the building footprint.

DEPARTMENT OF ENERGY
FY 1999 CONGRESSIONAL BUDGET REQUEST
(Changes from FY 1998 Congressional Budget Request are denoted with a vertical line in left margin.)

WEAPONS ACTIVITIES
(Tabular dollars in thousands. Narrative material in whole dollars.)

Weapons Stockpile Stewardship

1.	Title and Location of Project:	Dual-Axis Radiographic Hydrodynamic Test Facility (DARHT) Los Alamos National Laboratory, Los Alamos, New Mexico		2a. Project No.: 97-D-102 2b. Constructed Funded
		Preliminary Schedule	Title I Baseline	Current Baseline Schedule
3a.	Date A-E Work Initiated (Title I Design Start Scheduled):	3rd Qtr. FY 1988	3rd Qtr. FY 1988	3rd Qtr. FY 1988
3b.	A-E Work (Titles I & II) Duration:	36 months	36 months	45 months
4a.	Date Physical Construction Starts:	3rd Qtr. FY 1989	3rd Qtr. FY 1989	3rd Qtr. FY 1989
4b.	Date Construction Ends:	1st Qtr. FY 1999	1st Qtr. FY 1999	4th Qtr. FY 2002
		Preliminary Estimate	Title I Baseline	Current Baseline Estimate
5.	Total Estimated Cost (TEC) --	$105,700	$186,700*	$259,700**
6.	Total Project Cost (TPC) --	$114,760	$199,210	$269,800

* Includes $105,700 for Phase 1 and $81,000 as a planning estimate for Phase 2.
** Includes $105,700 for Phase 1 and $154,000 for Phase 2.

1. Title and Location of Project:	Dual-Axis Radiographic Hydrodynamics Test Facility (DARHT) Los Alamos National Laboratory, Los Alamos, New Mexico (continued)	2a. Project No.: 97-D-102 2b. Construction Funded

7. Financial Schedule (Federal Funds): a/

Fiscal Year	Appropriations	Adjustments	Obligations	Costs
1988	$ 1,800	$ 0	$ 1,800	$ 201
1989	9,700	0	9,700	2,912
1990	15,760	(4,855) c/	10,905	10,767
1991	16,800	(11,800) d/	5,000	7,558
1992	0	0	0	5,139
1993	0	3,500 e/	3,500	2,643
1994	17,000	0	17,000	5,881
1995	17,000	0	3,000	6,159
1996	16,495	0	19,495	5,045 f/
1997	0	0	11,000	23,873
1998	46,300 b/	0	46,300	49,672
1999	36,000	0	36,000	42,233
2000	61,000	0	61,000	58,341
2001	35,000	0	35,000	31,106
2002	0	0	0	8,170

8. Project Description, Justification and Scope

The Dual-Axis Radiographic Hydrotest Facility (DARHT) project was previously a subproject of the Nuclear Weapons Research, Development, and Testing Facilities Revitalization, Phase II project (88-D-106). With the virtual completion of the remaining ten subprojects in 88-D-106, the DARHT effort was established as a stand-alone project in FY 1997 so that it can be more readily managed, monitored and funded.

a/ Funds appropriated in FY 1988-1996 are from the DARHT subproject 88-D-106 and were moved to 97-D-102 to support management and monitoring of the project.
b/ FY 1998 funding represents $24,300,000 for completion of Phase 1 (first axis) and $22,000,000 for engineering planning and long-lead procurement for Phase 2.
c/ Reflects the sequestration of funds for FY 1990 and the FY 1990 Omnibus reprogramming approved by appropriation subcommittees.
d/ Reflects the FY 1991 Omnibus reprogramming approved by Congressional subcommittee.
e/ $3,500,000 redirected from prior year appropriation from Dormitories subproject of Line Item 88-D-106 at the Nevada Test Site (NTS)/
f/ Reflects actual costs for FY 1996.

8. Project Description, Justification and Scope: (Continued)

Justification

Since its inception in 1988, the DARHT project has been recognized as a key link in DOE efforts to maintain the quality and reliability of the nuclear weapons stockpile. Historically, radiographic hydrodynamic tests and dynamic experiments have been a requirement to support the DOE (and predecessor agencies) mission; they remain an important requirement for future efforts of the Stockpile Stewardship and Management (SS&M) Program as they assist in the understanding and evaluation of nuclear weapon performance. Dynamic experiments are used to gain information on the physical properties and dynamic behavior of materials used in nuclear weapons, including changes due to aging. Hydrodynamic tests are used to obtain diagnostic information on the behavior of a nuclear weapons primary (using simulated materials for the fissile materials in an actual weapon) and to evaluate the effects of aging on the nuclear weapons remaining in the greatly reduced stockpile. The information that comes from these types of tests and experiments cannot be obtained in any other way.

The DOE existing capability to obtain diagnostic information was designed and implemented at a time when the organization could rely on direct observations of the results of underground nuclear tests to provide definitive answers to questions regarding nuclear weapons performance. Without the ability to verify weapons performance through nuclear tests, the remaining diagnostic tools are inadequate by themselves to provide sufficient information. Accordingly, as the Nation moves away from nuclear testing, DOE must enhance its capability to use other tools to predict weapons safety, performance, and reliability. In particular, DOE must enhance its capability to perform hydrodynamic experiments to assess the condition and behavior of nuclear weapons primaries.

Although the current U.S. stockpile is considered to be safe and reliable, the existing weapons are aging beyond their initial design lifetimes and, by the turn of the century, the average age of the stockpile will be older than at any time in the past. To ensure continued confidence in the safety and reliability of the U.S. nuclear weapons stockpile, DOE needs to improve its radiographic hydrodynamic testing capability as soon as possible. Uncertainty in the behavior of the aging weapons in the enduring stockpile will continue to increase with the passage of time because existing testing techniques, by themselves, are not adequate to assess the safety, performance, and reliability of the weapons primaries. Should DOE need to repair or replace any age-affected components, retrofit existing weapons, or apply new technologies to existing weapons, existing techniques are not adequate to assure weapons safety and reliability. In an era without nuclear testing, DOE believes that it is probable that the existing weapons will require these types of repairs or retrofits in the foreseeable future. DOE has determined that no other currently available advanced techniques exist that could provide a level of information regarding nuclear weapons primaries comparable to that which could be obtained from enhanced radiographic hydrodynamic testing.

8. Project Description, Justification, and Scope: (Continued)

In addition to weapons work, DOE uses its radiographic testing facilities to support many other science missions, and needs to maintain or improve its radiographic testing capability for this purpose. Hydrodynamic tests and dynamic experiments are important tools for evaluating conventional munitions; for studying hydrodynamics, materials physics, and high-speed impact phenomena; and for assessing and developing techniques for disabling weapons produced by outside interests.

Fiscal year 1999 funds will be used to continue design of Phase 2, procure long lead items, and manage the project.

Project History Leading to Current Project Scope

Originally, the project scope included two 16-MeV electron-beam accelerators producing x-rays. In FY 1990, the Department decided to defer construction of the Hydrotest Firing Site (HFS) pending completion of technology development verified by the test results from an Integrated Test Stand (ITS), which consisted of about 30 percent of one x-ray machine. Following the successful ITS test results, development and construction of the hydrotest firing site was re-scoped based on the recommendations of two independent "Blue Ribbon" review committees assembled to assist the Department of Energy (DOE) in enhancing the development of a vital hydrotest capability. The new scope provided for the development, procurement, and installation of the first of two 16-MeV flash x-ray machines (for dual-axis radiography) at the firing site; and construction of a weatherproof building to house the dual-axis radiographic systems and supporting calibration activities. Construction was resumed in FY 1994.

On January 26, 1995, an injunction was issued for this project by the United States District Court for the District of New Mexico, requiring a cessation of all actions associated with the DARHT construction project, including any construction, procurement, design, or any furtherance of the DARHT project pending completion and judicial review of an Environmental Impact Statement (EIS) and Record of Decision (ROD). In response, the Department ceased all project activities and completed an EIS for the project. A ROD was published in October 1995. The preferred option that was selected was to complete the project and operate the DARHT facility with the use of steel containment vessels to minimize the environmental impacts from operation of the facility. This containment option includes multiple phases to eventually obtain at least 75 percent reduction in the emissions from high-explosives testing when compared to the DARHT Baseline Alternative analyzed in the EIS. The January 1995 injunction was lifted in April 1996 and DARHT construction resumed in May 1996.

8. Project Description, Justification and Scope: (Continued)

The DARHT project is now redefined to comply with the ROD preferred alternative and is divided into three phases. The first phase, most of which has been in progress since FY 1988, consists of the construction of a Radiographic Support Laboratory (RSL) and a Hydrotest Firing Site (HFS), which includes the first of two flash x-ray machines. In addition, this phase includes: the initial stage of containment of emissions from the high-explosives experiments to be conducted at the facility; an increase in accelerator energy from 16 to 20 MeV; changes in the accelerator to generate higher electron-beam currents; and improved diagnostics. Phase 1 will be completed during FY 1998 and the first axis will become operational by June 1999. The second phase will include the second flash x-ray machine, as well as the second stage of increased containment of testing emissions. The third phase consists of the third and final stage of increased containment of testing emissions. Each of the three phases of the DARHT project are described in greater detail below.

Phase 1

Phase 1 provides for the construction of the Radiographic Support Laboratory, which is completed; development, procurement, and installation of the first of two flash x-ray machines (for dual-axis radiography) at the firing site; procurement and installation of state-of-the-art hydrodiagnostic instrumentation at the firing site; construction of a blastproof building to house the dual-axis radiographic systems and support calibration activities; and, the first containment vessel (an existing vessel design modified for DARHT testing).

Hydrotest Firing Site (HFS)

The entire HFS building is being constructed as part of this phase, as well as the first x-ray machine and all electronic and optical diagnostics. The second machine, necessary to complete the essential dual-axis configuration of the facility, will be built in a sequential manner (Phase 2), allowing it to take advantage of engineering and scientific advances that occur before its construction. The first machine is a state-of-the-art linear induction accelerator, producing an electron beam of approximately 20-MeV that will be converted into an x-ray beam. A high speed electronic data acquisition system, a firing site control system, and optical imaging systems will also be included. Optical instrumentation includes high-speed framing and streak cameras and laser velocity interferometers. To improve the diagnostics capability of this facility, a gamma-ray camera is included.

8. Project Description, Justification and Scope: (Continued)

The HFS building is a two-level, 39,650-square-foot building to house and operate both accelerators. The walls and roof are designed to shield personnel operating the facility from the radiation produced by the accelerators, as well as to resist blast forces resulting from the detonation of explosives. The accelerators will be located on a three foot thick concrete slab on grade. Both accelerator rooms contain a total of approximately 13,175 square feet and are equipped with a 10-ton capacity bridge crane. Completion of the entire building for both x-ray machines allows installation of the second machine (Phase 2) to take place without stopping hydrodynamic testing activities that would begin upon installation of the first machine.

The power supply rooms provide space adjacent to the accelerators for electrical equipment that serves the accelerators. These rooms are equipped with 3-ton capacity bridge cranes. The detection chamber is electromagnetically shielded. Adjacent to the detection chamber are the control room, a cable room, a capacitor discharge unit (CDU) room, and a computer room. The detection chamber, computer room and accelerator control room are also provided with an access flooring system. Other rooms include an optical room, an analyzer room, a Fabry Perot room, a laser illumination room, an assembly room, toilets, and mechanical/electrical equipment room. This area contains approximately 26,475 square feet.

Fire protection is provided throughout by a hydraulically designed foam/water automatic sprinkler system. Plumbing and process piping includes hot and chilled circulating water, potable hot and cold water, industrial cool water, sanitary sewer, compressed air, natural gas, transformer oil, and low-conductivity water systems. A boiler and two chillers are included to provide hot and cold water. This conditioned water is used for heating, ventilating, and air-conditioning the building, with the exception of the detection chamber and accelerator control room, which are serviced with "computer-type" units. Two above-ground, 12,000 gallon oil storage tanks, a cooling tower, and an electrical substation are provided. Power is supplied to the building from an existing 13.2 kV line. The building is equipped with communication systems that include telephone, intercom, and broad band communications.

Site work includes a new asphalt surfaced access road, an asphalt surfaced circulation road and parking area, surface drainage, and erosion control. Utilities extended to the site include natural gas, water, electrical power, and communication services. A septic tank and seepage pit are provided to handle the sanitary sewage.

For Phase 1, a prototype vessel system and a temporary cleanout unit are being fabricated to obtain the initial 5 percent reduction in testing emissions when compared to the DARHT Baseline Alternative analyzed in the EIS for the first five-year period of facility operation. The prototype vessel system will be a modification of an existing steel vessel design for experiments containing up to 27 kg of high-explosives.

8. Project Description, Justification and Scope: (Continued)

Phase 2

Included in DARHT Phase 2 is the second electron beam accelerator which will be installed in the second accelerator hall provided in Phase 1. The second machine, necessary to complete the essential dual-axis configuration of the facility, is being built in a sequential manner, allowing it to take advantage of engineering and scientific advances that have occurred since construction of the first machine. The planning estimate previously included for Phase 2 was based on the second accelerator technology being the same as that for the first phase accelerator. This was necessary to meet the schedule commitments of the EIS and resulting ROD. However, during the Technology Options Study on the second axis, several alternatives were investigated for the second axis machine. The study was reviewed by several independent consultants and, in September 1997, the Department selected the Long-Pulse Linear Induction Accelerator because it presented the greatest technological advancement for the lowest cost and least risk. The second machine will be capable of providing four high-quality beam pulses over four microseconds with each pulse comparable in quality to the single pulse machine in the first axis.

The technology selected for Phase 2 will require a machine that is longer than the accelerator hall currently under construction. The October 1995 Record of Decision stated that there would be no substantial change in the building footprint. To accommodate the longer machine, it will be necessary to increase the size of the west accelerator hall by 1,300 square feet. Other modifications to the HFS will include a larger roof hatch to install equipment, extension of the 3-foot thick accelerator foundation and glyucol system modifications. While these are modifications to the HFS which is being constructed as part of Phase 1, the changes are driven by Phase 2 requirements and are, therefore, budgeted for in Phase 2.

The 27,000 square foot vessel preparation facility will include high bay space for a cleanout bay, a process bay and two staging bays. The high bay spaces will be equipped with a 40-ton, a 50-ton, and a 5-ton bridge crane. This facility will also include a small analytical lab, change rooms, storage, waste storage, fabrication shop, a small multipurpose room, an area for office cubicles, and the mechanical/electrical support spaces.

Fire protection for the vessel preparation facility will be provided throughout by a hydraulically designed automatic sprinkler system. Areas with the potential for contamination will drain to a 25,000 gallon above-ground storage tank to provide secondary containment of the sprinkler water. The areas with the potential for contamination will also be connected to a mitigating debris recycling system. Other plumbing systems will be potable hot and cold water, hot and cold circulating water, a double wall drain line for potentially contaminated water, and sanitary waste drainage. A natural gas-fired boiler will provide the hot water and a chiller will provide the chilled water. The

8. Project Description, Justification and Scope: (Continued)

HVAC system will include a HEPA filtration system to vent the vessels. The areas with potential contamination will be designed for seven air changes per hour with a once-through air handling system. The analytical lab will be equipped with a fume hood. The building will be equipped with communication systems that will include telephone, intercom, and broad-bank communications.

Site work for the vessel preparation facility will include a new asphalt surfaced access road, a large asphalt paved circulation and parking area. The circulation area will be designed for the large vessel handling equipment and storage. There will also be approximately 2,000 square feet of covered storage. Utilities extended to the site will include natural gas, water sanitary sewer, electrical power, and communication services. Power sill be supplied to the building from an existing 13.2-kV line.

This phase includes a 50 kg containment vessel and a 27 kg confinement vessel. This results in a reduction in testing emissions of at least 40 percent when compared to the DARHT Baseline Alternative analyzed in the EIS will be realized during the second 5-year period of facility operation. Containment goals will be met or exceeded through the use of a combination of techniques: containment, material replacement, post-shot recovery, and program management.

Phase 3

Experience gained during Phases 1 and 2 will allow the final containment techniques to be implemented that would result in at least 75 percent reduction in testing emissions when compared to the DARHT Baseline Alternative analyzed in the EIS for the remaining years of facility operation. The Department of Energy will meet the release reduction goals of this phase through the use of the combination of techniques discussed above. The decision to possibly further reduce testing emissions by developing a vessel system capable of containing a 440-lb (200-kg) charge will be made during this phase. No additional funding would be required for Phase 3 unless a decision to develop the 440-lb (200-kg) vessel is made.

1. Title and Location of Project:	Dual-Axis Radiographic Hydrodynamics Test Facility (DARHT) Los Alamos National Laboratory, Los Alamos, New Mexico (continued)	2a. Project No.: 97-D-102 2b. Construction Funded

9. Details of Cost Estimate

		Item Cost	Total Cost
a.	Design and Management Costs		$ 60,200
	(1) Engineering design and inspection at approximately 24 percent of construction costs (Design, Drawings, and Specifications)	$ 43,637	
	(2) Construction management costs	0	
	(3) Project management at 9.1 percent of construction costs (Item c) g/	16,563	
b.	Land and land rights		0
c.	Construction costs		181,608
	1. Improvements to land h/	0	
	2. Buildings	33,184	
	3. Special equipment	148,424	
	4. Utilities h/	0	
	5. Demolition	0	
d.	Standard equipment		0
e.	Major computer items		0
f.	Removal cost less salvage		0
g.	Design and project liaison, testing, checkout and acceptance i/		0
h.	Subtotal (a through g)		$241,808
i.	Contingencies at approximately 7.4 percent of above costs j/		17,892
j.	Total line item cost (Section 11.a.1.(a))		$259,700
k.	LESS: Non-Federal contribution		0
l.	Net Federal total estimated cost (TEC)		$259,700

g/ Construction management costs are included with project management costs.

h/ Costs are included with building costs.

i/ Costs are included with ED&I.

j/ The costs incurred through FY 1997 are $70,200,000, so the contingency as a percentage of the uncosted balance is 10 percent.

10. Method of Performance

Design and procurement of the conventional facilities will be performed under negotiated architect-engineer contracts. To the extent feasible, construction and procurement will be accomplished by fixed-price contracts and subcontracts awarded on the basis of competitive bidding.

11. Schedule of Project Funding and Other Related Funding Requirements

	Prior k/ Years	FY 1997	FY 1998	FY 1999	FY 2000	Outyears	Total
a. Total project costs							
1. Total facility costs							
(a) Line item (Section 9.j.)	$ 46,305	$ 23,873	$ 49,672	$ 42,233	$ 58,341	$ 39,276	$259,700
(b) Plant, Engineering and Design (PE&D)	0	0	0	0	0	0	0
(c) Operating expense funded equipment	1,105	0	0	0	0	0	1,105
(d) Inventories	0	0	0	0	0	0	0
(e) Total facility costs (Federal and Non-Federal)	$ 47,410	$ 23,873	$ 49,672	$ 42,233	$ 58,341	$ 39,276	$260,805
2. Other project costs							
(a) R&D necessary to complete project	$ 1,471	$ 0	$ 0	$ 0	$ 0	$ 0	$ 1,471
(b) Conceptual design cost	260	0	0	0	0	0	260
(c) Decontamination and Decommissioning (D&D)	0	0	0	0	0	0	0
(d) NEPA documentation costs	2,960	0	0	0	0	0	2,960
(e) Other project related costs	0	2,795	0	469	0	1,040	4,304
(f) Total other project costs	$ 4,691	$ 2,795	$ 0	$ 469	$ 0	$ 1,040	$ 8,995
(g) Total project costs	52,101	$ 26,668	$ 49,672	$ 42,702	$ 58,341	$ 40,316	$265,800
(h) LESS: Non-Federal contribution	0	0	0	0	0	0	0
(i) Net Federal total project costs (TPC)	$52,101	$ 26,668	$ 49,672	$ 42,702	$ 58,341	$ 40,316	$265,800

k/ Reflects actual costs through 1996.

11. Schedule of Project Funding and Other Related Funding Requirements (Continued)

b. Related annual costs (estimated life of project -- 30 years)

1. Facility operating costs	$ 10,400
2. Facility maintenance and repair costs	0
3. Programmatic operating expenses directly related to the facility	8,000
4. Capital equipment not related to construction but related to the programmatic effort in the facility	0
5. GPP or other construction related to programmatic effort in the facility	0
6. Utility costs	0
7. Other costs	0
Total related annual costs	$ 18,400

12. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

a. Total project funding

1. Total facility costs

(a) Line item -- Construction line item costs for the engineering design, procurement, demolition, and construction are estimated to be $259,700,000 for Phases 1 and 2.

(b) PE&D -- None.

(c) Operating expense funded equipment -- This equipment is necessary to conduct the research and development (R&D).

(d) Inventories -- None.

2. Other project costs

(a) R&D necessary to complete construction -- Funded R&D costs are necessary to complete the equipment and vessel design.

(b) Conceptual design -- Approximately $260,000 was incurred at the inception of this project to establish the specific design and construction features.

(c) Decontamination and Decommissioning (R&D) -- There are no D&D costs associated with this project.

(d) NEPA documentation costs -- These are the costs of the DOE contractors, including Los Alamos National Laboratory, to support or prepare the EIS.

(e) Other project related funding -- These are the costs for (1) the FY 1997 Technology Options Study to evaluate the alternative technologies for the second x-ray machine, (2) facility start-up including the Readiness Assessment, and (3) management of operating expense items.

12. Narrative Explanation of Total Project Funding and Other Related Funding Requirements (Continued

b. Total related funding requirements

1. Facility operating costs -- These are all direct and indirect costs associated with maintaining the facility readiness for programmatic purposes. It includes facility maintenance, utility costs, space tax, organizational support, janitorial services, and security with both axes operational and in the final containment phase. It includes the RSL, HFS, and Vessel Preparation Facility. On average, the related effort is 28.5 FTE.
2. Facility maintenance and repair costs -- The facility maintenance and repair costs are included with operating costs.
3. Programmatic operating expenses directly related to the facility -- The annual programmatic operating expense will fluctuate significantly from year to year depending on the programmatic effort. The $8,000,000 is an average based on the FY 1997 effort at Phermex.
4. Capital equipment not related to construction but related to the programmatic effort of the facility -- None.
5. GPP or other construction related to the programmatic effort -- None.
6. Utility costs -- These costs are included with operating costs.
7. Other Costs -- None.

DEPARTMENT OF ENERGY
FY 1999 CONGRESSIONAL BUDGET REQUEST
(Changes from FY 1998 Congressional Budget Request are denoted with a vertical line in left margin.)

WEAPONS ACTIVITIES
(Tabular dollars in thousands. Narrative material in whole dollars.)

Weapons Stockpile Stewardship
Inertial Confinement Fusion

1. Title and Location of Project:	National Ignition Facility (NIF) Lawrence Livermore National Laboratory, Livermore, California	2a. Project No.: 96-D-111 2b. Construction Funded

SIGNIFICANT CHANGES

C None.

DEPARTMENT OF ENERGY
FY 1999 CONGRESSIONAL BUDGET REQUEST
(Changes from FY 1998 Congressional Budget Request are denoted with a vertical line in left margin.)

WEAPONS ACTIVITIES
(Tabular dollars in thousands. Narrative material in whole dollars.)

Weapons Stockpile Stewardship
Inertial Confinement Fusion

1.	Title and Location of Project:	National Ignition Facility (NIF) Lawrence Livermore National Laboratory, Livermore, California		2a. Project No.: 96-D-111 2b. Constructed Funded
		Preliminary Schedule	Title I Baseline	Current Baseline Schedule
3a.	Date A-E Work Initiated (Title I Design Start Scheduled):	1st Qtr. FY 1996	1st Qtr. FY 1996	1st Qtr. FY 1996
3b.	A-E Work (Titles I & II) Duration:	24 months	24 months	27 months
4a.	Date Physical Construction Starts:	3rd Qtr. FY 1997	3rd Qtr. FY 1997	3rd Qtr. FY 1997
4b.	Date Construction Ends:	3rd Qtr. FY 2002	3rd Qtr. FY 2003	3rd Qtr. FY 2003
		Preliminary Estimate	Title I Baseline	Current Baseline Estimate
5.	Total Estimated Cost (TEC) --	$ 842,600	$1,045,700	$1,045,700
6.	Total Project Cost (TPC) --	$1,073,600	$1,198,900	$1,198,900

7. Financial Schedule (Federal Funds):

Fiscal Year	Appropriations	Adjustments	Obligations	Costs
Previous	$ 0	$ 0	$ 0	$ 0
1996	37,400	0	37,400	33,990
1997	131,900	0	131,900	103,010
1998	197,800	0	197,800	180,600
1999	284,200	0	284,200	208,300
2000	248,100	0	248,100	199,900
2001	74,100	0	74,100	179,700
2002	65,000	0	65,000	122,000
2003	7,200	0	7,200	18,200

8. Project Description, Justification and Scope

The Project provides for the design, procurement, construction, assembly, installation, and acceptance testing of the National Ignition Facility (NIF), an experimental inertial confinement fusion facility intended to achieve controlled thermonuclear fusion in the laboratory by imploding a small capsule containing a mixture of the hydrogen isotopes, deuterium and tritium. The NIF is being constructed at the Lawrence Livermore National Laboratory (LLNL), Livermore, California as determined by the Record of Decision made on December 19, 1996, as a part of the Stockpile Stewardship and Management Programmatic Environmental Impact Statement (SSM PEIS).

The mission of the National Inertial Confinement Fusion (ICF) program is to achieve controlled thermonuclear fusion in the laboratory. This program supports the DOE mandate of maintaining nuclear weapons science expertise required for stewardship of the stockpile, testing of nuclear weapons effects, and the development of fusion power by providing a database for inertial fusion ignition. As a key element of the Stockpile Stewardship Program, the NIF is designed to achieve propagating fusion burn and modest (1-10) energy gain within 2-3 years of full operation and to conduct high energy density experiments, both through fusion ignitions and through direct application of the high laser power. This mission was identified in the NIF Justification of Mission Need, which was endorsed by the Secretary of Energy. Identification of target ignition as the next important step in ICF development for both defense and non-defense applications is consistent with the earlier (1990) recommendation of DOE's Fusion Policy Advisory Committee, and the National Academy of Sciences Inertial Fusion Review Group. In

8. Project Description, Justification and Scope (Continued)

1995, the DOE's Inertial Confinement Fusion Advisory Committee affirmed the program's readiness for an ignition experiment. A review by the JASONs in 1996 affirmed the value of the NIF for stockpile stewardship.

The NIF project supports the DOE mandate to maintain nuclear weapons science expertise required for stewardship of the stockpile. After the United States announcement of a moratorium on underground nuclear tests in 1992, the Department established the Stockpile Stewardship program to ensure the preservation of the core intellectual and technical competencies in nuclear weapons. In addition, as a means of reducing the danger posed by nuclear weapons proliferation, the President announced that the United States would seek a zero yield Comprehensive Test Ban Treaty (CTBT). The treaty was signed by the President on September 24, 1996, and submitted to the Senate for ratification on September 23, 1997. One of the six safeguards that defines the terms of the CTBT is the conduct of the Stockpile Stewardship program to ensure the safety and reliability of the stockpile. The NIF is one of the most vital facilities in that program. The NIF will provide the capability to conduct laboratory experiments to address the high energy density and fusion aspects that are so important to both primaries and secondaries in stockpile weapons.

At present, the Nation's computational capabilities and scientific knowledge are inadequate to ascertain all of the performance and safety impacts from changes in the nuclear warhead physics packages due to aging, remanufacturing, or engineering and design alterations. Such changes are inevitable if the warheads in the stockpile are retained well into the next century, as expected. In the past, the impacts of such changes were evaluated through nuclear weapon tests. Without underground tests, we will require better, more accurate computational capabilities to assure the reliability and safety of the nuclear weapons stockpile for the indefinite future.

To achieve the required level of confidence in our predictive capability, it is essential that we have access to near-weapons conditions in laboratory experiments. The importance of nuclear weapons to our national security requires such confidence. For detonation of weapon primaries, that access is provided in part by hydrodynamic testing. For secondaries and for some aspects of primary performance, the NIF will be a principal laboratory experimental physics facility.

The most significant potential commercial application of ICF in the long term is the generation of electric power. Consistent with the recommendations of the Fusion Policy Advisory Committee, the NIF will provide a unique capability to address critical elements of the inertial fusion energy program by exploring moderate gain (1 to 10) target designs, establishing requirements for driver energy and target illumination for high gain targets, and developing materials and technologies useful for civilian inertial fusion power reactors.

8. Project Description, Justification and Scope (Continued)

The ignition of an inertial fusion capsule in the laboratory will produce extremely high temperatures and densities in matter. Thus, the NIF will also become a unique and valuable laboratory for experiments relevant to a number of areas of basic science and technology.

The NIF is an experimental fusion facility consisting of a laser and target area, and associated assembly and refurbishment capability. The laser will be capable of providing an output pulse with an energy of 1.8 megajoules (MJ) and an output pulse power of 500 terawatts (TW) at a wavelength of 0.35 micrometers (μm) and with specified symmetry, beam balance and pulse shape. The NIF design calls for an experimental facility to house a multibeam line, neodymium (Nd) glass laser capable of generating and delivering the pulses to a target chamber. In the target chamber, a positioner will center a target containing fusion fuel, a deuterium-tritium mixture, for each experiment. Diagnostics provided by this project will provide the test data to demonstrate subsystem performance and initial operations.

The NIF experimental facility, titled the Laser and Target Area Building, will provide an optically stable and clean environment. This laser building will be shielded for radiation confinement around the target chamber and will be designed as a radiological, low-hazard facility capable of withstanding the natural phenomena specified for the LLNL site. The baseline facility is for one target chamber, but the design shall not preclude future upgrade for additional target chambers.

The NIF project consists of conventional and special facilities.

C Site and Conventional Facilities include the land improvements (e.g., grading, roads) and utilities (electricity, heating gas, water), as well as the laser building, which has an approximately 20,300 square meters footprint and 38,000 square meters in total area. It is a reinforced concrete and structural steel building that provides the vibration-free, shielded, and clean space for the installation of the laser, target area, and integrated control system. The laser building consists of two laser bays, each 31 meters (m) by 135 m long, and a central target area--a heavily shielded (1.8 m thick concrete) cylinder 32 m in diameter and 32 m high. The laser building includes security systems, radioactive confinement and shielding, control rooms, supporting utilities, fire protection, monitoring, and decontamination and waste handling areas. Optics assembly and refurbishment capability is provided for at LLNL by incorporation of an optics assembly area attached to the laser building and minor modifications of other existing site facilities.

8. Project Description, Justification and Scope (Continued)

C Special facilities include the Laser System, Target Area, Integrated Computer Control System, and Optics.

- The laser system is designed to generate and deliver high power optical pulses to the target chamber. The system consists of 192 laser beamlets configured to illuminate the target surface with a specified symmetry, uniformity, and temporal pulse shape. The laser pulse originates in the pulse generation system. This precisely formatted low energy pulse is amplified in the main amplifier. To minimize intensity fluctuation, each beam is passed through a pinhole in a spatial filter on each of the four passes through the amplifier and through a transport spatial filter. The beam transport directs each high power laser beam to an array of ports distributed around the target chamber where the frequency of the laser light is tripled to 0.35 μm, spatially modulated by phase plates and focused on the target. Systems are provided for automatic control of alignment and the measurement of the power and energy of the beam. Structural support and auxiliary systems provide the stable platform and utilities required.

- The target area includes a 10 m diameter, low activation (i.e., activated from radiation) aluminum vacuum chamber located in the Target Area of the laser building. Within this chamber, the target will be precisely located. The chamber and building structure provide confinement of radioactivity (e.g., x-rays, neutrons, tritium, and activation products). Diagnostics will be arranged around the chamber to demonstrate subsystem performance for project acceptance (TEC) and initial operations (TPC). Structural, utility and other support systems necessary for safe operation and maintenance will also be provided in the Target Area. The target chamber and staging areas will be capable of conducting experiments with cryogenic targets. The Experimental Plan indicates that cryogenic target experiments for ignition will be needed 2-3 years after completion of the project. Therefore, the targets and this cryogenic capability will be supplied by the experiments. The NIF project will make mechanical and electrical provisions necessary to position and align the cryogenic targets within the chamber. The baseline is for indirectly driven targets. An option for future modifications to permit directly driven targets is included in the design.

- The integrated computer control system includes the computer systems (note: no individual computer will cost over $100,000) required to control the laser and target systems. The system will provide the hardware and software necessary to support NIF operations. Also included is an integrated timing system for experimental control of laser and diagnostic operations. Safety interlocks and access control will also be provided.

8. Project Description, Justification and Scope (Continued)

- Thousands of optical components will be required for the 192 beamlet NIF. These components include laser glass, lenses, mirrors, polarizers, deuterated potassium dihydrogen phosphate crystals, pulse generation optics, debris shields and windows, and the required optics coatings. Optics includes quality control equipment to receive, inspect, characterize, and refurbish the optical elements.

In FY 1999, funds will be used to complete Title II detailed design, and to continue conventional facility construction and special equipment procurement/installation.

9. Details of Cost Estimate

		Item Cost	Total Cost
a.	Design and Management Costs		$ 220,100
	(1) Engineering design and inspection at approximately 21.9 percent of construction costs (Item c)	$152,000	
	(2) Construction management at approximately 3.1 percent of construction costs (Item c)	21,500	
	(3) Project management at approximately 6.7 percent of construction costs (Item c)	46,600	
b.	Land and land rights		0
c.	Construction costs		693,800
	1. Improvements to land	1,800	
	2. Buildings modification	175,800	
	3. Site-specific infrastructure	0	
	4. Other Structures	0	
	5. Utilities	500	
	6. Special Facilities	515,700	
d.	Standard equipment		0
e.	Major computer items		0
f.	Removal cost less salvage		0
g.	Design and project liaison, testing, checkout and acceptance		0
h.	Subtotal (a through g)		$ 913,900
i.	Contingencies at approximately 15.1 percent of remaining costs at completion of Title I Design		131,800
j.	Total line item cost (Section 11.a.1.(a))		$ 1,045,700 a/
k.	LESS: Non-Federal contribution		0
l.	Net Federal total estimated cost (TEC)		$ 1,045,700

a/ Based on 100 percent Title I design completion.

9. Details of Cost Estimate (Continued)

The cost estimate assumes a project organization and cost distribution consistent with the management requirements appropriate for a DOE Strategic System as outlined in the DOE Order 430.1, Life Cycle Asset Management and the NIF Project Execution Plan. Actual cost distribution will be in conformance with accounting guidelines in place at the time of project execution.

10. Method of Performance

The NIF Laboratory Project Office (consisting of LLNL, LANL, SNL, and UR/LLE and supported by competitively-selected contracts with Architect Engineering firms, a Construction Manager, equipment and material vendors, and construction firms) will prepare the design, procure equipment and materials, and perform conventional construction, safety, system analysis, and acceptance tests. DOE will maintain oversight and coordination through the Headquarters Office of Inertial Fusion and the National Ignition Facility Project and the field office. DOE conducted the site selection and the NEPA determination. LLNL was selected as the construction site in the Record of Decision made on December 19, 1996. The procurement and installation/test of special equipment will be performed by the NIF Laboratory Project Office. Inspection and Title III engineering contracts for the conventional systems will be competitively awarded. NIF start-up will be conducted by the NIF laboratory operations staff.

11. Schedule of Project Funding and Other Related Funding Requirements

	Prior Years b/	FY 1997	FY 1998	FY 1999	FY 2000	Outyears	Total
a. Total project costs							
1. Total facility costs							
(a) Line item (Section 9.j.)	$ 33,990	$103,010	$180,600	$ 208,300	$199,900	$319,900	$1,045,700
(b) Plant, Engineering and Design (PE&D)	0	0	0	0	0	0	0
(c) Operating expense funded equipment	0	0	0	0	0	0	0
(d) Inventories	0	0	0	0	0	0	0
Total facility costs (Federal and Non-Federal)	$ 33,990	$103,010	$180,600	$ 208,300	$199,900	$319,900	$1,045,700
2. Other project costs							
(a) R&D necessary to complete construction	$ 7,500	$ 28,700	$ 52,000	$ 12,550	$ 150	$ 0	$ 100,900
(b) Conceptual design costs	12,300	0	0	0	0	0	12,300
(c) Decontamination and Decommissioning (D&D)	0	0	0	0	0	0	0
(d) NEPA documentation costs	2,600	650	550	400	200	200	4,600
(e) Other project related costs	14,218	2,632	2,450	2,550	5,600	7,950	35,400
(f) Total other project costs	$ 36,618	$ 31,982	$ 55,000	$ 15,500	$ 5,960	$ 8,150	$ 153,200
(g) Total project costs	$70,608	$134,992	$235,600	$223,800	$205,850	$328,050	$1,198,900
(h) LESS: Non-Federal contribution	0	0	0	0	0	0	0
(i) Net Federal total project costs (TPC)	$70,608	$134,992	$235,600	$223,800	$205,850	$328,050	$1,198,900

b/ Prior year actuals are changed to reconcile with DOE Financial Information System (FIS) costs and corrections have been made to cost account WBS assignment.

11. Schedule of Project Funding and Other Related Funding Requirements (Continued)

	Prior Years b/	FY 1997	FY 1998	FY 1999	FY 2000	Outyears	Total
Budget Authority (BA) requirements:							
TEC c/	$ 37,400	$ 131,900	$ 197,800	$ 284,200	$ 248,100	$146,300	$1,045,700
OPC d/	$ 41,800	$ 59,200	$ 31,300	$ 6,800	$ 10,000	$ 4,100	$ 153,200
Total	$ 79,200	$ 191,100	$ 229,100	$ 291,000	$ 258,100	$150,400	$1,198,900

b. Related annual costs (estimated life of project--30 years)

1.	Facility operating costs	$ 20,600
2.	Facility maintenance and repair costs	32,400
3.	Programmatic operating expenses directly related to the facility	59,600 e/
4.	Capital equipment not related to construction but related to the programmatic effort in the facility	200
5.	GPP or other construction related to programmatic effort in the facility	200
6.	Utility costs	8,800
7.	Other costs	6,200
	Total related annual costs	$ 128,000

b/ Prior year actuals are changed to reconcile with DOE Financial Information System (FIS) costs and corrections have been made to cost account WBS assignment.
c/ Specific long-lead procurements and contracts (e.g., building construction; major laser, optics, target area special equipment) require BA in advance of costs.
d/ Specific long-lead procurements and contracts (e.g., optics facilitization) require BA in advance of costs.
e/ This primary experimental operating expense will be included in the base Inertial Confinement Fusion Program budget.

12. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

a. Total project costs

1. Total facility costs

(a) Line item --Narrative not required.
(b) PE&D -- None.
(c) Operating expense funded equipment -- None.
(d) Inventories -- None.

2. Other project costs

(a) R&D necessary to complete construction -- Costs include optics vendor facilitization ($73,200,000) and optics quality assurance ($27,700,000).
(b) Conceptual design and engineering studies -- Includes the original conceptual design report completed in FY 1994 ($12,000,000) and the conceptual design activities for the optical assembly and refurbishment capability and site infrastructure ($300,000).
(c) Decontamination and decommissioning (D&D) -- None.
(d) NEPA documentation -- Preparation includes the NIF portion of the Stockpile Stewardship and Management Programmatic Environmental Impact Statement ($2,600,000) and environmental monitoring and permits ($2,000,000).
(e) Other project related costs -- Engineering studies (including advanced conceptual design) of project options ($5,800,000); assurances, safety analysis, and integration ($9,300,000); start-up planning, management, training, and staffing ($8,600,000); procedure preparation ($1,500,000); operating spares ($600,000); start-up ($7,700,000); and Operational Readiness Review ($1,900,000).

12. Narrative Explanation of Total Project Funding and Other Related Funding Requirements (Continued)

b. Related annual costs

1. Facility operating costs -- Includes operator labor, engineering support and materials for upgrades and modifications, and consumables for operation of special equipment.
2. Facility maintenance and repair costs -- Includes cost of labor, engineering support, and consumables for special equipment maintenance and refurbishment, including optics. Also includes maintenance for the laser building and support buildings.
3. The current NOVA experimental program, including LLNL, LANL, SNL, and General Atomics, is approximately $40,100,000 annually. Based on use of complex cryogenic targets, increased diagnostics support, and higher levels of three dimensional physics modeling, the annual direct NIF experimental program costs are estimated at $59,600,000. Additional program costs will be associated with use of the facility.
4. Fabrication accounts, procurements, such as small lasers and some laser parts, Computer-Aided Design systems, etc. to support upgrades.
5. Minor additions and modifications to the facility related to programmatic effort.
6. Electricity only. Gas, sewer, water, etc. are paid out of the General and Administrative budget.
7. Nitrogen and argon for laser and transport beam tubes, stock inventory, and procurement support.

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WEAPONS ACTIVITIES
(Tabular dollars in thousands. Narrative material in whole dollars.)

Weapons Stockpile Stewardship

1.	Title and Location of Project:	Contained Firing Facility Addition	2a. Project No.: 96-D-105
		Lawrence Livermore National Laboratory, Livermore, California	2b. Construction Funded

SIGNIFICANT CHANGES

- Gross square footage (gsf) of the facility has increased from 28,900 gsf to 37,570 gsf. The Conceptual Design Report did not properly include 4,490 gsf associated with the original Support Facility. The remaining 4,180 gsf increase resulted from Title II Design changes (Firing Chamber - 770 gsf; Support Facility - 2,720 gsf; Diagnostic Equipment Facility - 450 gsf; and Office Module - 240 gsf.) However, there is no increase to Total Estimated Cost (TEC) because some non-essential scope was deleted during Title II design.

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WEAPONS ACTIVITIES
(Tabular dollars in thousands. Narrative material in whole dollars.)

Weapons Stockpile Management

1.	Title and Location of Project:	Contained Firing Facility Addition Lawrence Livermore National Laboratory, Livermore, California		2a. Project No.: 96-D-105 2b. Construction Funded
		Preliminary Schedule	Title I Baseline a/	Current Baseline Schedule
3a.	Date A-E Work Initiated (Title I Design Start Scheduled):	1st Qtr. FY 1996	2nd Qtr. FY 1996	2nd Qtr. FY 1996
3b.	A-E Work (Titles I & II) Duration:	14 months	16 months	16 months
4a.	Date Physical Construction Starts:	4th Qtr. FY 1997	3rd Qtr. FY 1997	3rd Qtr. FY 1997 b/
4b.	Date Construction Ends:	3rd Qtr. FY 1999	3rd Qtr. FY 1999	3rd Qtr. FY 1999 b/
		Preliminary Estimate	Title I Baseline	Current Baseline Estimate
5.	Total Estimated Cost (TEC) --	$ 47,900	$ 49,700	$ 49,700
6.	Total Project Cost (TPC) --	$ 50,635	$ 52,765	$ 52,765

a/ Reflects design baseline after completion of Titles I and II.

b/ Construction design revisions are being considered which may revise project schedule and cost profile.

1. Title and Location of Project:	Contained Firing Facility Addition Lawrence Livermore National Laboratory, Livermore, California (continued)	2a. Project No.: 96-D-105 2b. Construction Funded

7. Financial Schedule (Federal Funds):

Fiscal Year	Appropriations	Adjustments	Obligations	Costs b/
1996	$ 6,600	$ 0	$ 6,600	$ 2,550
1997	17,100	0	17,100	4,707
1998	19,300	0	19,300	10,000
1999	6,700	0	6,700	21,293
2000	0	0	0	11,150

8. Project Description, Justification and Scope

Project Justification

The purpose of this project is to minimize hazardous emissions to the environment, reduce quantities of hazardous waste, and provide a continuing capability to test the high explosive component of a nuclear weapon. These goals will be achieved through the design and use of a contained firing chamber and support structures at LLNL's existing firing site, Bunker 801 at Site 300.

Lawrence Livermore National Laboratory maintains and operates open-air high explosive test facilities at Site 300 as part of their Stockpile Stewardship program. Many of the devices involved in these tests contain toxic and/or low level radioactive materials (depleted uranium). At present, the firing operations at these facilities are in compliance with all applicable environmental laws. However environmental standards are evolving at a rapid pace and it is expected that LLNL's open-air explosive testing will come under increased scrutiny as these regulations become more stringent.

This project will be the pacesetter in the area of explosive testing technology. The project will provide the capability to reduce to negligible levels the emissions of hazardous materials into the environment during and after explosive testing and will reduce the total amount of hazardous wastes generated. In addition it will provide a safer work environment, fully compatible with evolving plans for nearby commercial/residential development.

b/ Construction design revisions are being considered which may revise project schedule and cost profile.

8. Project Description, Justification and Scope: (Continued)

The testing areas at Site 300 offer combined diagnostic capabilities that exist nowhere else. Most test shots are one-of-a-kind, each being assembled under the day to day scrutiny of the weapons designer. Since most shots are of a development nature, it is important that they be transported a minimum distance from their assembly point to the test facility. Finally, because the intense level of interaction between the weapon designer, the shot diagnosticians and firing facility operators, these testing facilities must be located close to the design laboratory.

An essential ingredient of all nuclear weapons is the chemical high explosive component which provides the energy necessary to drive the fissile material to criticality, producing the initial fission yield. The shaping and timing of the detonation wave in the high explosive component is crucial to weapon performance. The sensitivity of the high explosive component to abnormal environments determines weapon safety. The testing facilities at Site 300 are dedicated to these necessary studies of weapon performance and safety.

The Site 300 Contained Firing Facilities Addition requested herein is required for three reasons:

1. Environmental consideration
2. Operational and cost saving advantages
3. Flexibility in application of diagnostic technology

Environmental Requirements

Environmental regulations require that hazardous materials be accounted for and tracked from their point of generation to their disposal. This regulation may soon be applied to LLNL site 300 high explosives testing operations. A contained firing chamber provides an intrinsic solution to the issue of accountability since no uncontrolled transfer of these materials from the firing chamber to the environment will occur. This will be true for shrapnel and particulates resulting from the shot as well as the detonation gases themselves. This concept will also apply to water used to clean the inside of the chamber.

Site 300 has had no close-in residential neighbors since its creation in the early 1950's. However, it is now faced with encroachment of a major residential development along its north and northeast boundaries. Nearby residents may be impacted by blast noise. They may also perceive health risks from low level toxic/radioactive emissions. Controlling the release of blast pressure and potentially hazardous emissions will reduce the public's perception of risk as well as the potential for environmental impact.

8. Project Description, Justification and Scope: (Continued)

The quantities of hazardous waste produced from weapons shots will be minimized. Since gravel will not be necessary in the chamber, no contaminated firing table gravel will be produced. Tents and other coverings for experiments used in open air firing, resulting in additional wastes, will also no longer be necessary.

Operational Advantages

The time and cost of periodic firing table gravel changeout will be eliminated. Cleanup of shots will be more efficient, producing substantially less total hazardous wastes. Some muster zones and areas of safety control will no longer be necessary with contained firing. The actual firing time of any experiment now depends on weather conditions. When atmospheric inversions exist, blast effects could inadvertently be focused on surrounding communities (Tracy, Livermore). A contained firing chamber will eliminate this dependency and allow firing at any time, under any weather conditions. The cost of maintaining fire trails and performing extensive burnoff of surrounding hillsides to minimize fire hazards will be reduced. The vault-like nature of the structure will minimize the need for security protection or concerns should an unauthorized individual approach a firing area during a shot. This is a concern that will increase with encroaching residential development.

Flexibility in Diagnostic Technology

The contained firing chamber concept is consistent with the development and application of advanced diagnostic techniques. Such new diagnostics are required in order that reliable new weapons may continue to be put into the arsenal, especially considering the current moratorium on nuclear testing and the Comprehensive Test Ban Treaty, which was signed by the President on September 24, 1996, and is awaiting ratification. Weapons safety testing is another area of increasing importance that will be supported by this facility. Advanced diagnostics include such items as time sequenced x-ray imaging of the detonation and multiple beam laser velocimetry. Careful design of the enclosed firing chamber will further enhance the potential for improved diagnostics by providing an environmentally conditioned space for the test assembly with close-in diagnostic access.

8. Project Description, Justification and Scope: (Continued)

Project Description

The Contained Firing Facility Addition is a capability addition to the Flash X-Ray Facility at Lawrence Livermore's Site 300. It is a facility of approximately 37,570 square feet (SF), consisting of four related structures, to increase the safety and environmental compliance of firing explosive charges up to a 60 kg limit of energetic high explosives. This project builds on to the existing Building 801 (B801) firing bunker at the existing firing table site adjacent to B801. The four structures are a structurally reinforced Firing Chamber, a Support Facility, a Diagnostic Equipment Facility and an Office Module.

The Firing Chamber is designed to contain the effects of cased high explosive materials used in various laboratory experiments. The explosive quantities vary in operational weight up to approximately 60 kg, or an equivalent TNT design weight of approximately 206.3 pounds. The chamber must be protected from shrapnel from explosive casings. All major structural elements are to remain elastic to permit repetitive chamber usage with no structural damage.

The restraints imposed by the number and pattern of the existing camera ports, whose inclusion within the chamber is required, led to the selection of a chamber of approximately 4,470 SF. In this configuration loads are resisted by structural elements acting primarily in tension-flexure combination. The interior surfaces of the chamber will have a steel liner on the walls and ceiling and the floor. In addition, the walls and ceiling will have layers of removable mild steel plate for shrapnel protection, and the floor will be covered by a steel plate anvil directly under the firing area. The Firing Chamber includes a blast effects door to permit vehicle entry, blast effects doors for personnel entry, and numerous smaller openings for air ducts, diagnostic ports, cable penetrations and TV camera, all protected against shrapnel and pressure damage.

At B801, the existing bullnose will be cut away and be rebuilt as part of the new Firing Chamber. The existing Camera Room at this location will be retained and the chamber floor will be configured in order to accommodate the present camera room roof.

The Support Facility of approximately 23,810 SF provides a staging area for experiment preparation, storage of equipment and materials to be used, and personnel areas for lockers, toilets and decontamination showers. A mezzanine above the personnel area is used for mechanical equipment with an additional mechanical equipment area adjacent to the staging area. The Support Facility is comprised of a braced steel frame system. The roof is metal decking and a built-up roofing system.

8. Project Description, Justification and Scope: (Continued)

The Diagnostic Equipment Facility of approximately 6,650 SF is similar to the Support Facility and has a steel frame system. The roof is a metal deck with concrete, insulation, and a built-up roofing system. The interior space will have moveable full height partitions to accommodate a variety of diagnostic equipment. Adjacent to the CPU room will be a new stair to the existing facility for complete interior access to all areas. The wall will have penetrations for a variety of diagnostics. Access to the Support Facility will be from the diagnostic area through the locker, shower, toilet complex. The diagnostic area will have both fluorescent and dimmable incandescent light fixtures, a wet pipe sprinkler system, and an HVAC system with 95% efficient final filters. The space will also have floor drains and low conductivity water piping. This facility will require extensive earthwork.

The Office Module of approximately 2,640 SF will consist of 6 offices, a secretarial/filing room, a conference room and restrooms.

Access at B801 will be by means of new and existing roads. Drive areas around the Support Facility will be paved. A paved parking lot will be provided to replace parking stalls displaced by new facilities as well as to accommodate the increase in visitors and facility users. A net total of 21 parking spaces will be added. Non-hazardous sewage disposal for the proposed facilities will be by means of a new septic tank and leach field system at B801.

The Firing Chamber and Support Facility areas will have an air conditioning system consisting of air handling units with prefilters, final filters, energy recovery coil, direct expansion coil, electric resistance heaters, and a supply fan. The Firing Chamber purge system will consist of a supply fan and a pollution control system with prefilters, High Efficiency Particulate Air (HEPA) filters, wet scrubbers, and an exhaust fan.

Tasks associated with all buildings include the material handling system, instrumentation and control system, washwater control system, waste water filtration system, process utilities, and environmental compliance for airborne and waste water discharge from the facility. Material handling will be accomplished by providing a specially designed mobile crane with a capacity of 40 tons. Washwater control includes automatic and manual washdown for the Firing Chamber itself; while the other areas require only a manual washdown system. Process gases to be supplied to the facility include argon, methane, compressed air, vacuum, helium and nitrogen. Environmental control requires the monitoring of combustion gases and waste water. To measure residual contamination levels, a number of unique measuring devices will be provided.

The FY 1999 funds will be used for construction and inspection.

1. Title and Location of Project:	Contained Firing Facility Addition Lawrence Livermore National Laboratory, Livermore, California (continued)	2a. Project No.: 96-D-105 2b. Construction Funded

9. Details of Cost Estimate c/

		Item Cost	Total Cost
a.	Design and Management Costs		$ 13,360
	(1) Engineering design and inspection at approximately 32.2 percent of construction costs (Item c)	$ 8,210	
	(2) Construction management at 7.8 percent of construction costs (Item C)	1,980	
	(3) Project management at 12.4 percent of construction costs (Item C)	3,170	
b.	Land and land rights		0
c.	Construction costs		25,480
	1. Improvements to land	760	
	2. Buildings	21,050	
	3. Other structures	0	
	4. Utilities	780	
	5. Special facilities	0	
	6. Activation	2,800	
	7. Security	90	
d.	Standard equipment		3,090
e.	Major computer items		0
f.	Removal cost less salvage		0
g.	Design and project liaison, testing, checkout and acceptance		0
h.	Subtotal (a through g)		41,930
i.	Contingencies at approximately 18.5% of above costs		7,770
j.	Total line item cost (Section 11.a.1.(a))		$ 49,700
k.	LESS: Non-Federal contribution		0
l.	Net Federal total estimated cost (TEC)		$ 49,700

c/ Current estimate is based on Title I design revision of December 1996.

10. Method of Performance

Contracting arrangements are as follows: Design will be on the basis of a negotiated architect-engineer contract. Major equipment requiring long lead time will be purchased by LLNL early in the project on the basis of competitive bidding. To the extent feasible, construction will be accomplished by a fixed-price contract awarded on the basis of competitive bidding. Minor architect-engineering work and activation will be performed by LLNL forces.

11. Schedule of Project Funding and Other Related Funding Requirements

	Prior Years	FY 1997	FY 1998	FY 1999	FY 2000	Outyears	Total
a. Total project costs							
1. Total facility costs							
(a) Line item (Section 9.j.)	$ 2,550	$ 4,707	$ 10,000	$ 21,293	$ 11,150	$ 0	$ 49,700
(b) Plant, Engineering and Design (PE&D)	0	0	0	0	0	0	0
(c) Operating expense funded equipment	0	0	0	0	0	0	0
(d) Inventories	0	0	0	0	0	0	0
(e) Total facility costs (Federal and Non-Federal)	$ 2,550	$ 4,707	$ 10,000	$ 21,293	$ 11,150	$ 0	$49,700
2. Other project costs							
(a) R&D necessary to complete project	$ 1,305	$ 0	$ 0	$ 0	$ 0	$ 0	$ 1,305
(b) Conceptual design cost	460	0	0	0	0	0	460
(c) Decontamination and Decommissioning (D&D)	0	0	0	0	0	0	0
(d) NEPA documentation costs	160	0	0	0	0	0	160
(e) Other project related costs	520	0	0	0	620	0	1,140
(f) Total other project costs	$ 2,445	$ 0	$ 0	$ 0	$ 620	$ 0	$ 3,065
(g) Total project costs	4,995	$ 4,707	$ 10,000	$ 21,293	$ 11,770	$ 0	$ 52,765
(h) LESS: Non-Federal contribution	0	0	0	0	0	0	0
(i) Net Federal total project costs (TPC)	$ 4.995	$ 4,707	$ 10,000	$ 21,293	$ 11,770	$ 0	$ 52,765

11. Schedule of Project Funding and Other Related Funding Requirements (Continued)

b. Related annual costs (estimated life of project-- 40 years)

1. Facility operating costs	$ 610
2. Facility maintenance and repair costs (included in 1. above)	0
3. Programmatic operating expenses directly related to the facility	4,375
4. Capital equipment not related to construction but related to the programmatic effort in the facility	100
5. GPP or other construction related to programmatic effort in the facility	0
6. Utility costs	240
7. Other costs	0
Total related annual costs	$ 5,325

12. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

a. Total project funding
   1. Total facility costs
      (a) Line Item -- No narrative required.
      (b) PE&D -- None.
      (c) Operating expense funded equipment -- None.
      (d) Inventories -- None.
   2. Other project costs
      (a) R&D necessary to complete construction -- Scale model testing was performed to provide design basis. Waste stream studies were performed to certify non-reactivity.
      (b) Conceptual design -- Total funding in this classification represents the conceptual design cost and other studies determined to be necessary.
      (c) Decontamination and Decommissioning (D&D) -- None.
      (d) NEPA documentation -- Support cost for the EA process.
      (e) Other project funding costs -- Project support costs of administration, Preliminary Safety Analysis Report, Management Program Review, Facility Safety Procedures, training startup, and other related project support costs.

12. Narrative Explanation of Total Project Funding and Other Related Funding Requirements (Continued)

b. Related annual costs

1. Facility operating costs -- Operating, maintenance and repair costs of the facility are estimated to be $610,000 per year (based on: operating, maintenance and repair costs of 2.9% of replacement value). This facility is an addition to an existing facility, B801.
2. Facility maintenance and repair costs -- Included in Facility Operating costs.
3. Programmatic Operating Expenses Directly Related to the Facility -- This estimate is for 25 total programmatic and support personnel at $175,000 average per person in FY 1999, who are currently connected with B801 operations.
4. Capital equipment not related to construction but related to the programmatic effort in the facility -- This is an average annual estimate which includes both the small items needed for continuous operation of the facility and the occasional large item over $100,000 which cannot be described at this time, but can be predicted as needed to maintain technical excellence in efforts conducted in the facility.
5. GPP or other construction related to programmatic effort in the facility -- Initially no GPP costs are anticipated but to keep abreast of technology, presently undefined alterations will likely be required in the future.
6. Utility costs -- The estimated annual utility cost is $240,000 based on a projected utility/power cost of $6.50 per square feet in FY 1999.
7. Other related costs -- No narrative required.

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WEAPONS ACTIVITIES
(Tabular dollars in thousands. Narrative material in whole dollars.)

Weapons Stockpile Stewardship

1.	Title and Location of Project:	Processing and Environmental Technology Laboratory Sandia National Laboratories, Albuquerque, New Mexico	2a. Project No.: 96-D-104 2b. Construction Funded

SIGNIFICANT CHANGES

C The design for this project was reviewed extensively during FY 1997 and validated by an independent review. As a result of Title II Design, the following changes are being made:

- The building size is 151,435 gross square feet with a net square feet total of 79,163.
- Chilled water for the building cooling and process equipment will be supplied by the existing chillers in Building 858. The water will be cooled at night and stored in a 1,000,000 gallon water tank for use in PETL the following day. The tank will be funded and constructed as part of the PETL scope. The cost of the tank is estimated to be approximately $73,000 more than the equipment that it is replacing (2 chillers, cooling towers, etc.). However, estimated cost savings in energy and maintenance labor is $170,000/year.
- Elements of the cost estimate have been revised to reflect the latest estimates and overhead loads for all categories. The construction cost estimate is based on the Title II cost estimate which was validated by an independent review. The project, design, and construction management estimates are all developed as actual estimates of time needed for the task, and have been adjusted to reflect experience with recently completed projects. The equipment estimates have been adjusted due to recent polls of potential vendors.
- The TPC decreases slightly because Other Project Costs (OPC) have been lowered as a result of a recent reevaluation of work that is needed to support the capital activity.

- The last year of funding (FY 2001) is combined with FY 2000 in order to purchase all of the special equipment during FY 2000 which will allow for more efficient installation and completion of this project.

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WEAPONS ACTIVITIES
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Weapons Stockpile Stewardship

1.	Title and Location of Project:	Processing and Environmental Technology Laboratory (PETL) Sandia National Laboratories, Albuquerque, New Mexico		2a. Project No.: 96-D-104 2b. Construction Funded
		Preliminary Schedule	Title I Baseline a/	Current Baseline Schedule
3a.	Date A-E Work Initiated (Title I Design Start Scheduled):	2nd Qtr. FY 1996	2nd Qtr. FY 1996	2nd Qtr. FY 1996
3b.	A-E Work (Titles I & II) Duration:	17 months	17 months	17 months
4a.	Date Physical Construction Starts:	1st Qtr. FY 1997	2nd Qtr. FY 1998	2nd Qtr. FY 1998
4b.	Date Construction Ends:	1st Qtr. FY 1999	4th Qtr. FY 2000	4th Qtr. FY 2000
		Preliminary Estimate	Title I Baseline	Current Baseline Estimate
5.	Total Estimated Cost (TEC) --	$ 45,900	$ 45,900	$ 45,900
6.	Total Project Cost (TPC) --	$ 48,600	$ 47,190	$ 45,190

a/ Reflects design baseline after completion of Titles I and II.

1. Title and Location of Project:	Processing and Environmental Technology Laboratory Sandia National Laboratories, Albuquerque, New Mexico (continued)	2a. Project No.: 96-D-104 2b. Construction Funded

7. Financial Schedule (Federal Funds):

Fiscal Year	Appropriations	Adjustments	Obligations	Costs
1996	$ 1,800	$ 180 b/	$ 1,980	$ 893
1997	14,100	0	14,100	2,859
1998	0	0	0	8,703
1999	18,920	0	18,920	16,277
2000	10,900	0	10,900	17,097
2001	0	0	0	71

8. Project Description, Justification and Scope

The Processing and Environmental Technology Laboratory (PETL) is a new laboratory/office facility to be located on a presently vacant site. The proposed building is a three-story building with a partial basement. The building will contain approximately 151,435 gross square feet with a total net square feet of 79,163. The Office/Laboratory consists of two primary functional areas, laboratory and office space. The offices are located at the eastern end of the facility, and the laboratory service areas and loading docks are located at the west end. The building is designed to meet the latest ES&H requirements for facilities of this type. Vibration isolation, pedestrian circulation, emergency egress, separation between laboratory and technician work stations, and separate laboratory service corridors which serve as secondary emergency exits are all design responses to identified user requirements. The building will have a modular design to facilitate varying the size of laboratory and office spaces in minimum time and at low costs, as user requirements change. The building is oriented on an east-west axis to achieve maximum opportunity for solar gain along the south elevations.

Generally, interior walls are gypsum board over metal studs. Appropriate fire separation barriers will be provided as required by the Life Safety Code and the DOE order for fire protection. The structural system will consist of steel and/or concrete framing as required to meet the users' vibration criteria for sensitive equipment. Laboratory floor systems will likely be constructed with waffle or pan joist framing. The exterior finish of the building will be a low maintenance product that is designed to integrate with the existing campus architecture.

b/ Internal reprogramming of $180,000 was provided to allow management efficiencies achievable through coordination of engineering and design contracts.

8. Project Description, Justification and Scope: (Continued)

The heating, ventilating, and air conditioning systems include a double duct, variable air volume (VAV), perimeter heating/cooling system, and a core or interior single duct VAV system. Heating will be provided by piped hot water generated by a gas-fire boiler. A large thermal storage water tank filled with chilled water from existing chillers in Building 858 will provide cold water for building cooling and test equipment. Interior plumbing systems will include sanitary waste, domestic hot and cold water, compressed air, natural gas, and chilled water supply and return. Exhaust will be provided by utility fans located at the roof level, connected to exhaust duct risers in chases. Site utilities include a primary electric feeder, single duct, water, natural gas, and sanitary sewer. Area improvements will include security fencing, storm drain inlets, and service and driveway areas. Landscaping, including trees, shrubs, irrigation systems and gravel, will be provided consistent with existing landscape practices.

The PETL is an important element that will enable the Department of Energy (DOE)'s Stockpile Stewardship and Management program to use an aggressive R&D program to develop production processes which will offer significant cost reductions and minimize the use of toxic materials. The synergism represented by PETL meets the DOE's objective in that it collocates individuals responsible for identifying and developing new materials and processes with those translating them to application.

The focus of PETL is the development, characterization, and application of modern processing while at the same time ensuring the safety of the environment and personnel, and producing products required for nuclear weapons applications. PETL allows the integration of real-time, on-line diagnostics, and test structures in processing lines for "self-identification" of processing problems. The substitution of environmentally safer processing chemicals will be analyzed to minimize design impact and to assess the affect on long-term compatibility. Analytical support for production of non-nuclear components will replace services provided by integrated complex plants, as the manufacturing complex is reduced in size and Manufacturing Development Engineering (MDE) increases.

Because DOE is faced with developing a more efficient complex to produce and to dismantle weapons, as well as to address ES&H issues affecting operations and nuclear weapon production, additional space is needed for efforts involving materials compatibility, aging, and reliability. These efforts are essential in certifying the reliability of the nuclear weapons stockpile.

PETL occupants will include: the Materials and Process Sciences Center, the Engineered Materials and Processes Center, and parts of the Environment Center and the Microelectronics Center. It will provide facilities for staff seeking timely solutions to the following critical problems:

8. Project Description, Justification and Scope: (Continued)

- Assuring safety and reliability of a smaller stockpile incorporating new materials and processes for production.
- Elimination of some materials from nuclear weapons because of production/usage restrictions, or total bans, and increased requirements to minimize occupational exposure with minimum effect on the reliability of nuclear weapons.
- Substitution of environmentally safer materials and processes during nuclear weapon production, with minimum effect on the reliability of nuclear weapons.
- Elimination/reduction of hazardous waste (radioactive, mixed, or chemically hazardous) during nuclear weapon production and better treatment (including detoxification or stabilization) of newly generated hazardous wastes.
- Dismantling nuclear weapons in an environmentally acceptable and safe manner.
- Compliance by SNL and the Nuclear Weapons Complex with ES&H laws, regulations, DOE orders, and industry standards.

Currently, materials activities are divided among nine different buildings. PETL will allow these activities to be centralized into one facility. Because most of the current laboratories are located in old facilities, the move to PETL will assist in conforming to current and expected regulations, DOE orders, and best industry ES&H practices. The new building is designed to conduct environmentally and occupationally safe R&D involving hazardous materials used in weapon production.

The FY 1999 funds will be used to continue construction.

8. Project Description, Justification and Scope: (Continued)

Removal Plan:

The following buildings will be vacated by organizations proposing to move to the PETL:

Building	Year Acquired	Building Size (Net Square Feet)	Space Vacated (Net Square Feet)	Organization(s)
805	1959	48,471	40,923	1800
806	1961	39,640	8,565	1800
807	1966	52,845	3,561	1800
823	1982	79,667	3,503	6600
828	1946	11,475	1,064	1800
894	1950	75,514	302	1800
T-47	1979	3,273	1,356	1800
897	1995	81,534	3,000	1800
858	1985	71.648	5,437	1300
Total			67,711	

Building 828 is considered substandard and included in the SNL substandard and temporary abandoned building decontamination and disposal program under a separate, future expense-funded project. It is expected the other space vacated by future PETL occupants will be backfilled by technical and administrative organizations as part of the Lab-wide space planning strategy.

1. Title and Location of Project:	Processing and Environmental Technology Laboratory Sandia National Laboratories, Albuquerque, New Mexico (continued)	2a. Project No.: 96-D-104 2b. Construction Funded

9. Details of Cost Estimate

	Item Cost	Total Cost
a. Design and Management Costs		$ 6,083
(1) Engineering design and inspection at approximately 12.5 percent of construction costs, (Item C) (Design, Drawings, and Specifications $1,500)	$ 3,617	
(2) Construction Management at approximately 4.5 percent of Construction Costs (Item C)	1,304	
(3) Project Management at 4 percent of Construction Costs	1,162	
b. Land and land rights		0
c. Construction costs		28,930
1. Improvements to land	350	
2. Buildings	27,780	
3. Other structures	0	
4. Utilities	800	
5. Special facilities	0	
d. Equipment		6,105
1. Special equipment	4,897	
2. Standard equipment	1,208	
e. Major computer items		0
f. Removal cost less salvage.		0
g. Design and project liaison, testing, checkout and acceptance		0
h. Subtotal (a through g)		41,118
i. Contingencies at approximately 11.6 percent of above costs.		4,782
j. Total line item cost (Section 11.a.1.(a))		$ 45,900
k. LESS: Non-Federal contribution		0
l. Net Federal total estimated cost (TEC)		$ 45,900

10. Method of Performance

Design and inspection shall be performed under a negotiated architect-engineering contract. Construction and procurement shall be accomplished by fixed-price contracts awarded on the basis of competitive bidding.

11. Schedule of Project Funding and Other Related Funding Requirements

	Prior Years	FY 1997	FY 1998	FY 1999	FY 2000	Outyears	Total
a. Total project costs							
1. Total facility costs							
(a) Line item (Section 9.j.)	$ 893	$ 2,859	$ 8,703	$ 16,277	$ 17,097	$ 71	$ 45,900
(b) Plant, Engineering and Design (PE&D)	0	0	0	0	0	0	0
(c) Operating expense funded equipment	0	0	0	0	0	0	0
(d) Inventories	0	0	0	0	0	0	0
Total facility costs (Federal and Non-Federal)	$ 893	$ 2,859	$ 8 ,703	$ 16,277	$ 17,097	$ 71	$ 45,900
2. Other project costs							
(a) R&D necessary to complete project	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
(b) Conceptual design cost	220	0	0	0	0	0	220
(c) Decontamination and Decommissioning (D&D)	0	0	0	0	0	0	0
(d) NEPA documentation costs	90	0	0	0	0	0	90
(g) Other project related costs	801	29	50	50	50	0	980
(h) Total other project costs	$ 1,111	$ 29	$ 50	$ 50	$ 50	$ 0	$ 1,290
(i) Total project costs	2,004	$ 2,888	$ 8,753	$ 16,327	$ 17,147	$ 71	$47,190
(j) LESS: Non-Federal contribution	0	0	0	0	0	0	0
(k) Net Federal total project costs (TPC)	$ 2,004	$ 2,888	$ 8,753	$ 16,327	$ 17,147	$ 71	$47,190

11. Schedule of Project Funding and Other Related Funding Requirements (Continued)

b. Related annual costs (estimated life of project--50 years)

1. Facility operating costs	$ 631
2. Facility maintenance and repair costs	312
3. Programmatic operating expenses directly related to the facility	45,903
4. Capital equipment not related to construction but related to the programmatic effort in the facility	1,800
5. GPP or other construction related to programmatic effort in the facility	0
6. Utility costs	610
7. Other costs	0
Total related annual costs	$49,256

12. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

a. Total project funding
   1. Total facility costs
      (a) Line Item -- Narrative not required.
      (b) PE&D -- None.
      (c) Operating expense funded equipment -- None.
      (d) Inventories -- None.
   2. Other project costs
      (a) R&D necessary to complete project -- None.
      (b) Conceptual design costs -- Prepared by Dekker and Associates, Architects, Albuquerque, New Mexico, in January 1990, and then revised in November 1992.
      (c) Decontamination and Decommissioning -- None.
      (d) NEPA documentation costs -- A Finding of No Significant Impact (FONSI) was issued on December 18, 1995.
      (e) Other project related costs -- Includes in-house engineering support, project development and project management costs prior to authorization, a Safety Assessment, and non-dedicated support activities throughout this project life.

12. Narrative Explanation of Total Project Funding and Other Related Funding Requirements (Continued)

b. Related annual costs (estimated life of project--50 years)

1. Facility operating costs are estimated by using data for typical office/laboratory facilities at Sandia National Laboratories (SNL), Albuquerque, New Mexico (NM).
2. Facility maintenance and repair costs are estimated by using data for typical office/laboratory facilities at SNL/NM.
3. Programmatic operating expenses directly related to the facility include salaries and supplies for approximately 200 people estimated at $229,518 per person per year.
4. Capital equipment not related to construction but related to the programmatic effort in the facility is estimated using historical data associated with the annual replacement of worn-out analytical equipment.
5. GPP or other construction related to the programmatic effort in the facility--None.
6. Utility costs were estimated using the gas and electric consumption rates from the Title Energy Conservation Report and water use data from other typical office/laboratory facilities at SNL/NM.
7. Other costs--None.

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WEAPONS ACTIVITIES
(Tabular dollars in thousands. Narrative material in whole dollars.)

Weapons Stockpile Stewardship

1.	Title and Location of Project:	Atlas Los Alamos National Laboratory, Los Alamos, New Mexico	2a. Project No.: 96-D-103 2b. Construction Funded

SIGNIFICANT CHANGES

- None.

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WEAPONS ACTIVITIES
(Tabular dollars in thousands. Narrative material in whole dollars.)

Weapons Stockpile Stewardship

1.	Title and Location of Project:	Atlas Los Alamos National Laboratory, Los Alamos, New Mexico		2a. Project No.: 96-D-103 2b. Construction Funded
		Preliminary Schedule	Title I Baseline a/	Current Baseline Schedule
3a.	Date A-E Work Initiated (Title I Design Start Scheduled):	1st Qtr. FY 1996	2nd Qtr. FY 1996	2nd Qtr. FY 1996
3b.	A-E Work (Titles I & II) Duration:	15 months	15 months	15 months
4a.	Date Physical Construction Starts:	2nd Qtr. FY 1997	3rd Qtr. FY 1997	TBD b/
4b.	Date Construction Ends:	3rd Qtr. FY 1999	3rd Qtr. FY 1999	TBD b/
		Preliminary Estimate	Title I Baseline	Current Baseline Estimate
5.	Total Estimated Cost (TEC) --	$ 43,300	$ 43,300	$ 43,300
6.	Total Project Cost (TPC) --	$ 48,442	$ 48,500	$ 48,500

a/ Reflects design baseline after completion of Titles I and II.

b/ Construction design revisions are being considered which will revise project schedule and may affect cost profile. Physical construction did not start the 3rd Qtr. FY 1997 as originally scheduled.

7. Financial Schedule (Federal Funds):

Fiscal Year	Appropriations	Adjustments	Obligations	Costs b/
1996	$ 8,400	$ 0	$ 8,400	$ 1,000
1997	15,100	0	15,100	6,864
1998	13,400	0	13,400	14,236
1999	6,400	0	6,400	21,200

8. Project Description, Justification and Scope

The United States entered the extended test moratorium in July 1993. Without underground testing, above ground experiments (AGEX) are the best means available to exercise and validate design judgement. They help mitigate the technical risks and the loss of stockpile-related judgement associated with a no-test environment by exercising weapons skills.

Above ground experiments (AGEX) that address secondary weapons physics issues require an energy-rich, high energy density environment. In above-ground experiments in the laboratory, one can examine individual aspects of secondary weapons physics using three classes of facility: pulsed power for high energy; high energy lasers for high power; and ultra high-intensity lasers for extreme energy-density conditions. No single technology can access the full range of conditions to meet the needs of the weapons program for above-ground experiments. To simultaneously achieve the full spectrum of conditions present in a nuclear weapon, an underground test is required.

The Atlas facility will provide enhanced Los Alamos National Laboratory (LANL) pulsed power experimental capability to support high energy AGEX, an essential capability requirement for DOE's stockpile stewardship program.

The scope of work includes:

- Design, procurement, assembly, and installation of the Atlas 45-50 Megampere, 30-36 Megajoule capacitor bank with associated controls and power supplies in Buildings 125 and 294 at TA-35.

b/ Construction design revisions are being considered which will revise project schedule and may affect cost profile. Physical construction did not start the 3rd Qtr. FY 1997 as originally scheduled.

8. Project Description, Justification and Scope: (Continued)

- Modification of approximately 34,000 square feet of Building 125 at TA-35 to support Special Facilities Equipment (SFE) installation and completion of operational upgrades to the facility.

- Utilization of existing 1,430 MVA generator in Building 301 at TA-35 for electrical power.

- Installation of a power storage equipment area of 2,600 square feet in Building 294 and upgrades to the control room area of 1,600 square feet in Building 125 at TA-35; also provides power distribution and diagnostic cabling to experiments in Building 125.

- Completion of site work and utilities to support the use of up to 3 Government-Furnished diagnostic trailers and installation of new dielectric oil storage tank adjacent to Building 125 at TA-35.

The use of the existing Los Alamos Antares facility with internal modifications of power, HVAC, and partition systems will permit a cost-effective, conveniently located facility to be added to the existing inventory of experimental facilities supporting high energy density physics at LANL. The chosen site will permit sharing the existing 1,430 MVA generator in Building 301 at LANL.

The FY 1999 funds will be used to complete the building modifications and install Atlas pulsed power equipment.

1. Title and Location of Project:	Atlas Los Alamos National Laboratory, Los Alamos, New Mexico (continued)	2a. Project No.: 96-D-103 2b. Construction Funded

9. Details of Cost Estimate

		Item Cost	Total Cost
a.	Design and Management Costs		$ 8,585
	(1) Facility engineering design and inspection at approximately 29.2 percent of construction costs.	$ 737	
	(2) SFE Engineering Design and Inspection at approximately 21.7 percent of SFE costs (Item e)	5,124	
	(3) Project and construction management at approximately 10.4 percent of construction costs (Item c & e)	2,724	
b.	Land and land rights		0
c.	Construction costs		2,523
	1. Improvements to land	99	
	2. Building modifications.	2,424	
	3. Other structures	0	
	4. Utilities	0	
	5. Special facilities	0	
d.	Standard equipment		0
e.	Special faciities equipment (SFE)		23,624
f.	Removal cost less salvage		0
g.	Design and project liaison, testing, checkout and acceptance		146
h.	Subtotal (a through g)		$34,878
i.	Contingencies at approximately 24.1 percent of above costs		8,422
j.	Total line item cost (Section 11.a.1.(a))		$43,300
k.	LESS: Non-Federal contribution		0
l.	Net Federal total estimated cost (TEC)		$43,300

10. Method of Performance

Facility, design and inspection will be performed under a negotiated architect or engineering contract. SFE design and inspection is to be performed by LANL personnel. Construction and construction procurement will be accomplished by fixed price contracts awarded on the basis of competitive bidding. Procurement of Government Furnished Equipment will be performed by LANL and will be accomplished by competitive fixed price or CPFF contracts. SFE will be installed by LANL and the site services contractor.

1. Title and Location of Project:	Atlas Los Alamos National Laboratory, Los Alamos, New Mexico (continued)	2a. Project No.: 96-D-103 2b. Construction Funded

11. Schedule of Project Funding and Other Related Funding Requirements

	Prior Years	FY 1997	FY 1998	FY 1999	FY 2000	Outyears	Total
a. Total project costs							
1. Total facility costs							
(a) Line item (Section 9.j.)	$ 1,000	$ 6,864	$ 14,236	$ 21,200	$ 0	$ 0	$ 43,300
(b) Plant, Engineering and Design (PE&D)	0	0	0	0	0	0	0
(c) Operating expense funded equipment	0	0	0	0	0	0	0
(d) Inventories	0	0	0	0	0	0	0
(e) Total facility costs (Federal and Non-Federal)	$ 1,000	$ 6,864	$ 14,236	$ 21,200	$ 0	$ 0	$ 43,300
2. Other project costs							
(a) R&D necessary to complete project	$ 2,706	$ 707	$ 0	$ 0	$ 0	$ 0	$ 3,413
(b) Conceptual design cost	577	0	0	0	0	0	577
(c) Decontamination and Decommissioning (D&D)	0	0	0	0	0	0	0
(d) NEPA documentation costs	38	0	0	0	0	0	38
(e) Other project related costs	31	70	300	771		0	1,172
(f) Total other project costs	$ 3,352	$ 777	$ 300	$ 771	$ 0	$ 0	$ 5,200
(g) Total project costs	4,352	$ 7,641	$ 14,536	$ 21,971	$ 0	$ 0	$48,500
(h) LESS: Non-Federal contribution	0	0	0	0	0	0	0
(i) Net Federal total project costs (TPC)	$ 4,352	$ 7,641	$ 14,536	$ 21,971	$ 0	$ 0	$48,500

11. Schedule of Project Funding and Other Related Funding Requirements (Continued)

b. Related annual costs (estimated life of project--20 years)

1. Facility operating costs	$ 2,500
2. Facility maintenance and repair costs	1,000
3. Programmatic operating expenses directly related to the facility	12,500
4. Capital equipment not related to construction but related to the programmatic effort in the facility	0
5. GPP or other construction related to programmatic effort in the facility	0
6. Utility costs	462
7. Other costs	0
Total related annual costs	$ 16,462

12. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

a. Total project funding
   1. Total facility costs
      (a) Line Item -- Narrative not required.
      (b) PE&D -- None.
      (c) Operating expense funded equipment -- None.
      (d) Inventories -- None.
   2. Other project costs
      (a) R&D necessary to complete construction -- Prototype development.
      (b) Conceptual design -- Includes Functional and Operational Requirements, Conceptual Design Report, Construction Project Data Sheet, and Value Engineering
      (c) Decontamination and Decommissioning (D&D) -- None.
      (d) NEPA documentation -- Includes effort required to obtain NEPA Categorical Exclusion
      (e) Other project related funding -- Includes safety documentation, Preliminary Hazards Analysis, Operational Readiness Evaluation, Operational Readiness Review, acceptance and turnover, and Startup activities

12. Narrative Explanation of Total Project Funding and Other Related Funding Requirements (Continued)

b. Related annual costs

1. Facility operating costs -- $2,500,000 is for approximately 8-10 full-time-equivalent personnel who will be required to support Atlas operations. This staff would not directly support the fielding of experiments but would be responsible for planning and execution of service and maintenance so that the machine is ready and available for planned experiments or experimental campaigns.
2. Facility maintenance and repair costs -- $1,000,000 includes the routine rebuilding and servicing of the maintenance units which make up half of the energy of each tank. One of these units will always be out of the system for refurbishment and/or repair. In addition, the vacuum system, oil distribution system, SF6 gas system and other support systems will constantly require maintenance and refurbishment. This effort would require a staff of 4 full-time personnel. These costs also include the maintenance and repair of the building that houses the machine.
3. Programmatic operating expenses directly related to the facility -- $12,500,000 are required to support the specific experimental campaigns currently scheduled for Atlas at a shot rate of approximately 100 per year. This includes material costs for expendables such as liners, power flow channels and debris shields as well as the labor costs for direct scientific and experimental personnel. These costs also include the lease costs of the building that houses the machine.
4. Capital equipment not related to construction but related to the programmatic effort of the facility -- None.
5. GPP or other construction related to the programmatic effort -- None.
6. Utility costs -- $462,000 is to support natural gas, electricity, and steam usage either metered or assessed on a square footage basis. These costs are for approximately 34,000 square feet of occupied space.
7. Other costs -- None.

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WEAPONS ACTIVITIES
(Tabular dollars in thousands. Narrative material in whole dollars.)

Weapons Stockpile Stewardship

1.	Title and Location of Project:	Nuclear Weapons Stockpile Stewardship	2a. Project No.: 96-D-102
		Facilities Revitalization, Phase VI, Various Locations	2b. Construction Funded

SIGNIFICANT CHANGES

- Total estimated cost has increased from $72,876,000 to $74,226,000 as a result of increased workscope totaling $1,350,000 in subproject 03, 138 kV Substation Modernization at the Nevada Test Site (NTS). The new workscope will replace unreliable circuit switchers with new gas circuit breakers and add an additional supervisory control and data acquisition (SCADA) fiber optic communication segment.

- The Total Project Cost has increased $779,000 from $75,475,000 to $76,254,000. This is a net increase reflecting the $1,350,000 increase to the 138 kV Substation Modernization subproject and a decrease of $571,000 in miscellaneous project-related costs for several subprojects.

- The funding profile for the Site 300 Medical Facility, subproject 06, has been changed. Funding previously planned for FY 2000 has been moved forward to FY 1999 to allow for a more efficient schedule for completion of physical construction and procurement of required equipment for the project.

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WEAPONS ACTIVITIES
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Weapons Stockpile Stewardship

1.	Title and Location of Project:	Nuclear Weapons Stockpile Stewardship Facilities Revitalization, Phase VI, Various Locations		2a. Project No.: 96-D-102 2b. Construction Funded
		Preliminary Schedule	Title I Baseline	Current Baseline Schedule
3a.	Date A-E Work Initiated (Title I Design Start Scheduled):	1st Qtr. FY 1996	1st Qtr. FY 1996	1st Qtr. FY 1996
3b.	A-E Work (Titles I & II) Duration:	46 months	46 months	46 months
4a.	Date Physical Construction Starts:	3rd Qtr. FY 1997	3rd Qtr. FY 1997	3rd Qtr. FY 1997
4b.	Date Construction Ends:	4th Qtr. FY 1999	4th Qtr. FY 2000	4th Qtr. FY 2000
		Preliminary Estimate	Title I Baseline	Current Baseline Estimate
5.	Total Estimated Cost (TEC) --	$ 33,700 a/	$ 72,876	$ 74,226 b/
6.	Total Project Cost (TPC) --	$ 34,660 a/	$ 75,475	$ 76,254 b/

a/ The preliminary TEC/TPC for this project in FY 1996 includes only two subprojects. Additional subprojects were included in the FY 1997 (two) and FY 1998 (two) Construction Project Datasheets, bringing the total number of subprojects funded within this line item to six.

b/ Increases to TEC and TPC reflects increased scope for the 138-kV Substation Modernization subproject.

7. Financial Schedule (Federal Funds):

Fiscal Year	Appropriations	Adjustments	Obligations	Costs
1996	$ 2,520	$ 0	$ 2,520	$ 340
1997	19,250	0	19,250	3,744
1998	19,810	0	19,810	29,874
1999	20,423	0	20,423	22,914
2000	8,540	0	8,540	12,938
2001	3,683	0	3,683	4,416

8. Project Description, Justification and Scope

This series of projects provides for the construction of new facilities, and modifications, relocations, and additions to existing facilities for the Nuclear Weapons Stockpile Stewardship facilities at Sandia National Laboratories (SNL), Los Alamos National Laboratory (LANL), Lawrence Livermore National Laboratory (LLNL) and the Nevada Test Site (NTS). These projects are a multiyear capital investment program to revitalize the Nuclear Weapons Stockpile Stewardship complex. These facilities will replace or add to existing facilities and infrastructure that are overaged, deteriorated, overcrowded, or are inadequate to preserve capabilities required for the current and future weapons stockpile stewardship program.

The Nuclear Weapons Stockpile Stewardship program is made up of a highly complex set of activities which are extremely dependent on current and advanced technology facilities and equipment to meet its varied needs. The successful performance of the Stockpile Stewardship program contributes directly to the quality and reliability of the nuclear weapons stockpile. In addition to unremitting requirements for reliability and performance, we are committed to pursue new safety and safeguards features for the enduring stockpile. These standards require innovative physics concepts and designs, the development of new materials and material applications, and extension of both engineering and manufacturing technologies beyond the current "state-of-the-art". All of this requires support of a reliable infrastructure.

The revitalization effort was initiated in FY 1984 with Project 84-D-107, Nuclear Testing Facilities Revitalization, and was followed in FY 1985, FY 1988, FY 1990, FY 1992 and FY 1994 by follow-on phases. These projects were defined based on needs identified by representatives from the Albuquerque and Nevada Field Offices, and the three weapons laboratories. Since the initiation of these projects,

8. Project Description, Justification and Scope: (Continued)

all aspects of the laboratory complex capital asset base continued to be critically reviewed and have resulted in the initiation of this line item project which contains six subprojects.

The consolidation of the Nuclear Weapons Stockpile Stewardship revitalization needs into one project data sheet focuses the issue of the total needs of the Stockpile Stewardship program. With the decreased demand for new weapon systems, this project is oriented toward preserving the critically needed infrastructure at LANL, NTS, SNL, and LLNL.

In FY 1999 DOE will complete engineering, design, and start construction on subprojects 05 and 06, continue construction of subproject 03, and complete construction of subprojects 01, 02, and 04. These subprojects all cover general purpose facilities at various DOE locations that are an integral part of the installation support infrastructure. Included are basic utility systems, such as electrical power distribution, sewage, roads, parking lots, gas distribution, water supply, and the like. Many of these systems were constructed during the 1940s to World War II specifications with a 10-year maximum life expectancy. Many of them are now deteriorated beyond economic repair and do not meet present-day standards for safety and environmental protection.

Details of subprojects which require funding in FY 1999 and beyond are provided below.

Subproject 01 - Water Well Replacements, LANL, Los Alamos, New Mexico

TEC	Previous	FY 1997	FY 1998	FY 1999	FY 2000	Outyears	Construction Start - Completion Dates
$16,800	$ 1,000	$10,200	$4,500	$1,100	$0	$0	3rd Qtr. FY 1997 - 4th Qtr. FY 1999

This project is to provide four new 800-GPM, moderate yield, low-drawdown, production wells to replace six existing marginal or nonproducing wells located in the Guaje Well Field. The major components of work for each well location will include the following items: drilling, casing, and development of an approximately 2,000-foot deep well; a new deep well pump at the developed head, a new well house with roof hatch access, lights, heat and ventilation; discharge piping with flow meter, check valve and manual block valves to connect to existing distribution system; electrical power from existing overhead system; control scheme compatible with existing system, security fencing around the well house and a section of access road connecting with the existing Guaje Road.

8. Project Description, Justification and Scope: (Continued)

After the new wells are completed and on line, six existing wells will be taken out of service and the well, pump, pump house and all related site improvements will be removed and salvaged. All disturbed areas will be reseeded to match the natural surroundings.

This project is necessary to meet historical and fire protection water demand and to ensure a continuous and reliable water supply to the Laboratory. The majority of the Guaje wells were completed in 1950-1952 and do not meet the original capacity of 500 GPM due to pump deterioration, down-hole mineral deposits, and related well damage. Without the new wells, the capacity of the water system will continue to decline, resulting in capacity levels below the demands of the system. During peak summer demand periods, severe water usage curtailment measures would need to be implemented to avoid reducing the fire protection storage below allowable levels.

The Guaje Field is an integral part of a three-well field system that supplies potable and fire protection water to the Laboratory.

Subproject 02- Fire Protection Improvements, LANL, Los Alamos, New Mexico

TEC	Previous	FY 1997	FY 1998	FY 1999	FY 2000	Outyears	Construction Start - Completion Dates
$16,900	$ 1,520	$ 5,050	$5,450	$4,880	$0	$0	4th Qtr. FY 1997 - 4th Qtr. FY 1999

The purpose of this subproject is to provide improvements to water storage capabilities in selected Technical Areas, and associated distribution system piping to connect the new tanks to the existing system. An additional Technical Area will receive distribution lines from an existing water storage tank. Approximately 28 buildings will receive improvements to internal sprinkler and/or fire alarm systems. Approximately 144 buildings will receive lightning protection systems or additions to existing systems.

Included in this subproject is a 1,500,000 gallon ground storage tank, a 750,000 gallon storage tank, a 150,000 gallon storage tank, two 100,000 gallon storage tanks, 25,500 feet of related distribution line piping, and related pumps and tie-ins to existing components of the existing system.

8. Project Description, Justification and Scope: (Continued)

This project provides upgrades of the water system serving LANL and upgrades or new sprinkler and/or fire alarm systems in existing buildings in order to meet "improved risk" criteria from DOE Orders 6430.1A and 5480.7. These two orders mandate compliance with National Standards and are a proactive posture for loss prevention depending on the contents of the facilities and their importance to program requirements.

The water and sprinkler system deficiencies were identified in the 1976 Factory Mutual Survey and cited again in the 1989 Factory Mutual Survey. In addition to the Factory Mutual Surveys, six major deficiencies were cited in the DOE-wide Tiger Team Audit of 1991.

The majority of the water supply system for LANL was installed in the 1950's. As additional requirements were placed upon the system due to increased program needs, the distribution lines have been extended. The water storage and supply have not been improved to meet these requirements.

Subproject 03 - 138kV Substation Modernization, NTS, Las Vegas, Nevada

TEC	Previous	FY 1997	FY 1998	FY 1999	FY 2000	Outyears	Construction Start - Completion Dates
$11,992	$0	$1,000	$2,667 c/	$2,667	$1,975	$3,683 c/	4th Qtr. FY 1997 - 4th Qtr. FY 2000

The TEC for this subproject has been increased by $1,350,000 to cover additional workscope: the circuit switchers at Frechman Flat Substation, which are no longer reliable in their present configuration, will be replaced with gas circuit breakers; and, an additional SCADA fiber optic communications system segment has been added to make the entire SCADA system interconnected and provide the requisite level of redundancy.

c/ A reprogramming currently being considered within the Department would increase the funding available for this subproject in FY 1998 by $3,683,000 and would decrease the outyear funding requirement accordingly.

8. Project Description, Justification and Scope: (Continued)

This subproject will modernize two major substations [Jackass Flats Substation (JAF) and Canyon Substation (CA)], one switching center [Mercury Switching Center (MSC)], and one tap station [Valley Tap (VAT)] on the 138kV transmission system loop at the NTS. It will also provide for the installation of a fiber-optics communication loop. The Mercury Switching Center and the Jackass Flats Substation serve as termination points for the incoming power lines from outside utilities.

No major site improvements are proposed for the modernized facilities, except possible site and access road grading.

The JAF, CA, MSC, and VAT will each require modifications to the control buildings. Each building will provide an adequate environment for electrical relays, switchgear, breaker control panels, and telecommunications equipment. Each control building will contain a heating, ventilation, and air conditioning (HVAC) system; a fire detection and alarm system; electrical power for interior and exit lighting; battery-powered emergency lighting; telephones; and fully insulated walls and ceilings. The substations, switching center, and tap station will employ new gas breaker technology, microprocessor relays, supervisory control and data acquisition (SCADA) control of major equipment, and new fiber-optic cable for telecommunication requirements (relaying, metering, and telephone system).

The JAF is the termination point for the Valley Electric Association (VEA) 138kV line, which provides an alternate power source to the NTS. The Nevada Power Company (NPC) metering is located in this facility. This substation contains an autotransformer, which provides 138/69kV transformation and a 69kV bus with 69kV service to Area 25 at the NTS. The existing 69kV and 12kV facilities and lines will not be modified.

The CA is an important part of the overall NTS power system and feeds one of the largest loads at the NTS.

The MSC is the termination point for the Nevada Power Company (NPC) 138kV transmission line, which provides the primary source to the NTS. NPC metering is also located at this facility.

The VAT Switchstation will be a relaying point on the 138kV transmission loop to allow proper sectionalizing of the loop during fault conditions. This will maintain most of the users in service including Systems which accounts for over a third of the NTS power usage.

A fiber optics loop will enhance or upgrade the existing communications system. This fiber optics loop will employ approximately 100 miles of fiber optic cable wrapped around the existing overhead static wire on the NTS 138kV transmission line.

8. Project Description, Justification and Scope: (Continued)

The 138kV transmission loop with its associated facilities is the backbone of the entire NTS power system. Reliable power for all weapons testing programs, future missions, the Yucca Mountain Project, environmental programs, and many other projects and programs conducted at the NTS are dependent upon the reliability of these facilities. Maintenance of aging and failing equipment is becoming increasingly more difficult because many replacement parts are no longer available. The MSC and the JAF are the key substations at the NTS and connect to the outside utility companies, which provide electrical power to the site. Equipment failures in these facilities have a significant impact upon all NTS programs and the reliability of the entire power system.

Existing 138kV power facilities at the NTS are approximately 28 to 38 years old. The substation and switching center to be modernized in this subproject are among some of the oldest facilities at the NTS. Over the past several years increased outages due to equipment failure have occurred on a more frequent basis and will continue to accelerate until replaced.

The existing power line carrier communications system used for supervisory control has been in service long past its useful life span, and is obsolete and unreliable. Current power line carrier replacement projects have improved the communication capability as a stop-gap measure only, using existing fiber optic cables and borrowed microwave facilities until a new fiber optic loop is installed which will provide adequate speed and capacity for modern relaying, SCADA, and metering facilities. A new communications loop using fiber optics technology is the most practical solution to provide a long-term, reliable communication system for the NTS power system.

This subproject is needed in order to avoid future high maintenance expenses and frequent power interruption that NTS has experienced during critical times, to reduce the risk of serious or fatal injuries to the workers who maintain this deteriorating system, and to enable NTS to activate its readiness capability, if called upon.

Subproject 04 - Roof Replacement - Protection of Real Property, LLNL, Livermore, California

TEC	Previous	FY 1997	FY 1998	FY 1999	FY 2000	Outyears	Construction Start - Completion Dates
$7,810	$0	$3,000	$4,810	$0	$0	$0	2nd Qtr. FY 1998 - 1st Qtr. FY 1999

8. Project Description, Justification and Scope: (Continued)

This subproject is to reconstruct five of the most seriously deteriorated building roofs at LLNL. Many LLNL buildings were built in the 1960's and 1970's and their roofing systems have been in place far longer than their expected economic lives. These buildings have had many patches and repairs to solve leaks and deterioration of original roofing; however, entire roof systems now need to be reconstructed. The project addresses five buildings with the worst roof conditions. These buildings will require immediate attention within the next few years to maintain and protect the integrity of the facilities and to make sure that programmatic work can proceed without serious damage to the buildings and their contents. This subproject is the first phase of a proposed four-phase roof reconstruction effort.

For the Laboratory to perform the caliber and variety of scientific work found at LLNL, the support requirements are many. A well functioning, efficient, and modern infrastructure is crucial not only to the level of performance at the Laboratory, but also to the health and safety of all its staff and equipment inside the structures.

The roofs of over 100 buildings at LLNL have exceeded their life expectancy of 20 years. Many of these have deteriorated to a point where they require frequent repairs, and leaks jeopardize experiments, experimental data and equipment. The five roofs identified for inclusion in this subproject's scope of work have severe problems, including membrane failure and possible structural damage. The roofs for Buildings 131, 151, 253, 331 and 511 will be reconstructed. The need to replace the roofs is important to stop any serious damage to the main structure where the cost would be greater and programs would have to leave the building while work progressed. These five buildings identified are needed for weapons core competency.

In general, the deterioration of these roofing systems is such that repairs will neither stop the leakage nor be cost effective. Therefore, replacement of the roofing systems is the only viable solution.

Subproject 05 - Storm Drain, Sanitary Sewer, and Domestic Water Systems, Modernization, SNLA, Albuquerque, New Mexico

TEC	Previous	FY 1997	FY 1998	FY 1999	FY 2000	Outyears	Construction Start - Completion Dates
$15,374	$0	$0	$1,483	$7,326	$6,565	$0	1st Qtr. FY 1999 - 4th Qtr. FY 2000

8. Project Description, Justification and Scope: (Continued)

Much of the storm drain system, sanitary sewer system, and water distribution system at SNLA have been in place for 30 to 50 years. Studies and video inspection have shown that the systems are in need of rehabilitation and expansion. As time passes, utilities that support DOE programs will be threatened, and the probability of losses of equipment and time will increase. Systems in deteriorated condition have high maintenance costs.

This subproject at SNLA will: (1) rehabilitate and enlarge the storm drain system to reduce the risk of flooding of existing facilities, reduce or eliminate risks of soil and groundwater contamination, and minimize maintenance costs caused by the erosion of unlined channels; (2) rehabilitate the sanitary sewer system to address the issues of old, deteriorating sewer lines, and the threat of contamination of soil and water due to leakage by rehabilitating sewer lines and manholes; and (3) improve the water distribution system and fire protection by tying into the new Kirtland Air Force Base (KAFB) lines, improving electronic controls, installing water meters, and replacing several deteriorated water lines.

One of Sandia's environmental missions is to be in full compliance with the Federal environmental regulations, including all appropriate permitting. Regulatory drivers for this subproject include the Safe Drinking Water Act, National Pollutant Discharge Elimination System, 40 CFR 122, 123, and 124, the Clean Water Act, DOE Order 6430.1, and Tiger Team Finding SW/CF-04.

Storm Drain System

Comprehensive drainage system analyses have been completed for SNLA. These system analyses showed that six facilities in Technical Areas I, II, and IV would be impacted by the 100-year floodplain, including Building 880, which houses several Cray mainframe computers, key to a number of programs. Eight facilities in Technical Areas III and V would be impacted by the 100-year floodplain. Improvement to and expansion of the storm drain system as described below would remove the facilities in Technical Areas I, II, III, IV, and V from the 100-year floodplain.

Camera equipment was used to inspect the storm drain lines in 1992 and showed that approximately 26,524 feet of storm drain systems require major repair or replacement to alleviate flooding and structural failure. The majority of the failing system is in Technical Area I and has exceeded its 40-year design life.

8. Project Description, Justification and Scope: (Continued)

A sedimentation and capacity analysis performed for existing earth-lined channels determined that existing utilities adjacent to the channels are at risk to damage due to erosion of the channel flow. The results show that no matter how well the channels are maintained, failure is imminent. Failure will lead to roads being washed out leading to Technical Area IV, overtopping of the channel, and possibly flooding of facilities. This project proposes to line the existing channels with concrete to prevent erosion, increase capacity, protect utilities, and reduce the amount of sediment carried downstream.

The following improvements will be made to the Storm Drain System:

- Enlarge the 9th Street and 17th Street storm drains to accommodate the 100-year developed-conditions runoff, including the diversion of flows from the 14th Street and G Street intersection.
- Line the 9th Street, 14th Street, 17th Street, and a portion of the 20th Street channels to eliminate erosion and minimize sediment transport.
- Install a storm-drain pipe in the 20th Street channel from Harding Blvd. to G Street.
- Construct berms, channels, and inlets and upsize culverts in Technical Areas III and V.
- Further integrate streets and storm inlets to ensure that storm flows can reach the storm sewer systems.
- Replace deteriorated storm drain inlets and manholes.

Sanitary Sewer System

A condition assessment report for the sewer system was completed in 1992 using in-line camera inspection data. The report was updated in 1995. The report categorized 25 percent of the sanitary sewer lines in Technical Areas I, II, and IV, and 164 sewer manholes as in either "poor" or "fair" condition. This means that several miles of pipe have a high probability of leaking industrial wastewater into the surrounding soil through cracks, separated joints, and corroded pipes. The worst section of pipe are also in danger of collapsing and backing wastewater up into buildings, many of which are critical to the mission of SNLA. The proposed project will mitigate the poor condition of the system.

The following improvements will be made to the Sanitary Sewer System:

- Rehabilitate approximately 22,000 linear feet of the existing, deteriorated system using u-liner, slip lining, and open cut methods.
- Repair approximately 100 sewer manholes that are in "fair" or "poor" condition.

8. Project Description, Justification and Scope: (Continued)

Water Distribution System

Under National Fire Protection Association codes, redundant water supply is required for fire protection. An important part of this project is to improve fire protection by providing a redundant water supply and a properly grided system. Kirtland Air Force Base (KAFB) is installing a new supply and distribution system. This project makes several ties to the SNLA system to improve water distribution and fire protection in Technical Areas I, II, and IV.

The existing water distribution system does not have electronic storage-tank monitoring devices needed to monitor the system properly. SNLA is responsible via an interagency agreement with the Air Force for the operation and maintenance of the water system within SNLA boundaries. With basic electronic monitoring, SNLA will be able to monitor the system with confidence.

SNLA is currently unable to monitor water consumption. As part of a Memorandum of Understanding with Federal and state agencies, SNLA has agreed to cooperate in a water conservation effort. This project will provide meters at tie-in points to the KAFB system and will provide consumption data. This data will be used as part of a water conservation effort.

The following improvements will be made to the water distribution system:

- Install electronic monitoring equipment on the system.
- Install water meters at connections between Sandia and KAFB.
- Provide connections to the KAFB 36-inch transmission line along Hardin Boulevard and the 18-inch line along 20th Street.
- Replace deteriorated water lines.

Subproject 06 - Site 300 Fire Station/Medical Facility, LLNL, Livermore, California

TEC	Previous	FY 1997	FY 1998	FY 1999	FY 2000	Outyears	Construction Start - Completion Dates
$5,350	$0	$0	$900	$4,450	$0	$0	3rd Qtr. FY 1999 - 4th Qtr. FY 2000

8. Project Description, Justification and Scope: (Continued)

The Site 300 Fire Station/Medical Facility is a new building (approximately 7,475 net square feet, 8,500 gross square feet) to replace existing facilities required for emergency capability at Site 300. The existing facilities are over 30 years old and structurally, functionally, and operationally inadequate to fulfill their mission based on Department of Energy guidelines. The existing buildings do not meet the moderate hazard seismic classification needed for emergency service buildings and, in fact, do not even meet the criteria for low hazard seismic classification. This has become even more important in view of a newly identified seismic fault in the area.

Renovation of the existing fire station and medical facility was considered and deemed not economical nor desirable for the following reasons:

a. Major renovation is needed to meet the current seismic criteria. The large expenditure of funds required to upgrade buildings that should be replaced is of questionable value.

b. The renovation would not provide for the space needs for the Fire Department. There is no room for further expansion or modification of the building.

c. The existing location has very little space for turning onto the roadway. In fact, the turning radius of apparatus requires turning into the oncoming traffic lane when responding to the east. This existing condition would be perpetuated if the current facilities were renovated rather than replaced.

The proposed new Fire Station/Medical Facility will be located adjacent to the main site entrance. The project includes approximately 5,230 net square feet for the Fire Station; including apparatus bay, dormitories, office, kitchen, exercise room and storage; approximately 1,695 net square feet for the Medical Facility; including examination rooms, advance care room, office, lab, and storage. An additional 550 net square feet for a classroom and a decontamination room is provided for joint use.

9. Detail of Cost Estimate

This cost estimate is based upon completed individual conceptual design reports. Rates used for escalation were taken from applicable DOE Departmental Price Change Indices, applied to the mid-point of the construction schedule.

		Item Cost	Total Cost
a.	Design and Management Costs		$ 12,923
	(1) Engineering design and inspection at approximately 16.8 percent of construction costs	$ 8,243	
	(2) Construction management costs at approximately 4.2 percent of construction costs.	2,078	
	(3) Project management at 5.3 percent of construction costs	2,602	
b.	Land and land rights		0
c.	Construction costs		49,128
	1. Improvements to land	380	
	2. Buildings	14,176	
	3. Other structures	2,032	
	4. Utilities	24,041	
	5. Special facilities.	8,499	
d.	Standard equipment		200
e.	Major computer items		0
f.	Removal cost less salvage.		440
g.	Design and project liaison, testing, checkout and acceptance		0
h.	Subtotal (a through g)		$ 62,691
i.	Contingencies at approximately 18.4 percent of above costs.		11,535
j.	Total line item cost (Section 11.a.1.(a))		$ 74,226
k.	LESS: Non-Federal contribution		0
l.	Net Federal total estimated cost (TEC).		$ 74,226

10. Method of Performance

Design and procurement of the conventional facilities will be performed under negotiated architect-engineer contracts. To the extent feasible, construction and procurement will be accomplished by fixed-price contracts and subcontracts awarded on the basis of competitive bidding.

11. Schedule of Project Funding and Other Related Funding Requirements

	Prior Years	FY 1997	FY 1998	FY 1999	FY 2000	Outyears	Total
a. Total project costs							
1. Total facility costs							
(a) Line item (Section 9.j.)	$ 340	$ 3,744	$ 29,874	$ 22,914	$ 12,938	$ 4,416	$ 74,226
(b) Plant, Engineering and Design (PE&D)	0	0	0	0	0	0	0
(c) Operating expense funded equipment	0	0	0	0	0	0	0
(d) Inventories	0	0	0	0	0	0	0
Total facility costs (Federal and Non-Federal)	$ 340	$ 3,744	$ 29,874	$ 22,914	$ 12,938	$ 4,416	$ 74,226
2. Other project costs							
(a) R&D necessary to complete project	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0
(b) Conceptual design cost	1,072	0	0	0	0	0	1,072
(c) Decontamination and Decommissioning (D&D)	10	0	0	0	0	0	10
(d) NEPA documentation costs	114	10	0	0	0	0	124
(e) Other project related costs	221	180	123	128	118	52	822
(f) Total other project costs	$ 1,417	$ 190	$ 123	$ 128	$ 118	$ 52	$ 2,028
(g) Total project costs	$ 1,757	$ 3,934	$ 29,997	$ 23,042	$ 13,056	$ 4,468	$ 76,254
(h) LESS: Non-Federal contribution	0	0	0	0	0	0	0
(i) Net Federal total project costs (TPC)	$ 1,757	$ 3,934	$ 29,997	$ 23,042	$ 13,056	$ 4,468	$ 76,254

11. Schedule of Project Funding and Other Related Funding Requirements (Continued)

		Total
b.	Related annual costs (estimated life of project--30 years)	
1.	Facility operating costs	$ 100
2.	Facility maintenance and repair costs	208
3.	Programmatic operating expenses directly related to the facility	660
4.	Capital equipment not related to construction but related to the programmatic effort in the facility	50
5.	GPP or other construction related to programmatic effort in the facility	0
6.	Utility costs	56
7.	Other costs	0
	Total related annual costs	$ 1,074

12. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

a. Total project funding
   1. Total facility costs
      (a) Line item -- None.
      (b) PE&D -- None.
      (c) Operating expense funded equipment -- None.
      (d) Inventories -- None.
   2. Other project costs
      (a) R&D necessary to complete construction -- None.
      (b) Conceptual design -- Total funding in this category represents conceptual design costs of all subprojects.
      (c) Decontamination and Decommissioning -- D&D costs for all subprojects.
      (d) NEPA documentation -- NEPA documentation costs for all subprojects.
      (e) Other project related funding -- Total funding in this category represents a variety of small costs of all subprojects.

b. Related annual costs listed in Section 11.b. are the consolidation of the six subprojects for each category.